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Maintenance by Rule.

When a man knows where to look for a lost article, it is as good as found. Hence we have rules for inspecting the telephone plant. They are intended to give new men assistance, and to show the old ones what is expected of them. If a man will live up to any set of inspection rules consistently, he will probably find his district in fairly good shape. The object of preparing the rules is to make it easy for him to do work that is more than 99 per cent good. If the rules are made right, a man who knows them, and applies them with sense, will go from one job to another, doing at each place better work, and getting it done more quickly than the man who goes by guess.

Experience proves this—where you can find the rules and the men together. We believe that good maintenance men are more easy to find than good sets of instructions, and that there are some exchanges where making up a set of rules and living up to them would help the work along. The trouble with most sets of rules is that they are all made by the boss, who puts in a lot of things which sound good to him, and leaves out some of the essential points. Then the boys in the back room poke holes in his list and forget it. A good set of rules ought to be home-made, framed up in the inspectors' quarters, by all hands working together. The boys who do the work can set a stiffer mark to live up to than any boss would give them, and if they set it themselves, they are likely to try to hold the pace they say is a proper one. So, when the manager and the man who actually do the work, and see the troubles day after day, get together, we ought to expect an instruction sheet that leaves few weak spots uncovered.

Rules made by some insurance companies for inspection against fire risks are models of completeness. When a man has checked off each item mentioned, as found in proper condition after having had the necessary repairs made, he knows that he is ready to report "All O. K." How many times does the average telephone man leave a subscriber's station, or line wire, in condition to enable him to honestly report that nothing more should be done? We should like to see some attempts made, in exchanges of moderate size, to devise a set of rules that fully cover the requirements of local maintenance, without containing much unnecessary matter.

The set of rules printed on another page goes a long way in the right direction for a plant of this sort. It does well to recognize that the inspector is the company's representative before the public, and should take care of himself accordingly.

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And the idea of living up to it is undoubtedly a real help to the men who want to do good work. How many exchanges are there which have a set of inspection instructions as good as this?

Franchise Complexities.

Where telephone companies have been given the right by the state to use the public roads and highways for the purpose of their business, it is unnecesary for them to apply to the municipalities for franchises. This is a principle of wide significance that is receiving constantly increasing application among the courts of the country. It is also a principle that it is well for telephone companies about to organize to bear in mind. If a telephone company can legally do business in a city under the state law, it had better refrain from securing a municipal franchise because the possession of such franchise will, some day, rise, like Banquo's ghost, to haunt it.

The latest case in which the above principle has been applied is that of the Sunset Telephone & Telegraph Company against the city of Pasadena. A year ago, the city council of Pasadena passed an ordinance requiring all corporations to secure a franchise to do business in the city. An inspection of all lines were also provided for, and the police were empowered to declare certain lines a nuisance. The Sunset Telephone Company was the only corporation that was really affected by this ordinance, and when it refused to secure a franchise, an order was given to take down its poles. The telephone company immediately brought suit for an injunction to restrain the threatened action by the city and secured a favorable decision from Judge Hutton in the Superior Court of the State, sitting in and for the County of Los Angeles.

Judge Hutton decided that the securing of an original franchise to operate a telephone line in the streets of the city would be granting what the company already had, and of which the city could not deprive it. He holds that the company had that right not only from the act of Congress called the "Post Roads' Act, but also from Section 536 of the Civil Code of the state which provides that telegraph or telephone corporations may construct lines of telegraph or telephone among and upon any public road or highway. The city of Pasadena will probably carry the case to the highest court in the state. This decision is exactly contrary to a decision made by Judge Wellborn of the Federal Court in a suit of the same company against the city of Pomona.

The Line of Advance for Employees.

Advice to young men who work for telephone companies is freely given by owners of such properties, and by officers who have already worked themselves up to positions of prominence. It is a question how much good such advice does. But every young man in the business who has a proper ambition is likely, at some time or another, to study the forward steps which have been taken by his superior associates.

The first thing upon which his attention is likely to fall is the diligence of the men above. He sees that they have stuck to the job closely, and done a big day's work day after day. He notices that they have done each task well all the way through, and have not quit until they had finished. So much for that. But, he may say, something more is required. What is it?

Perhaps nothing is more essential for advancement than an appreciation of the relations of the parts of the telephone business to the whole. A man in the accounting department may know how much the maintenance of a plant costs per year, but without a broader knowledge he would not be able to put into effect improvements which would cut down the cost, or realize just what possibilities of this kind were open for investigation.

The telephone business is so big that the successful man is so well trained in one branch of the work as to be, to all intents, a specialist. But he must know very thoroughly how to take the best advantage of the co-operation of other specialists, with whom he is associated in the organization. For this reason, any informal meetings for the discussion of telephone work at which employees from different departments get together, and exchange experiences and ideas, is directly helpful to all. It is a very good measure for advancing the interests of those who participate, and of the company by which they are employed.

Why Telephone Combination Is Opposed.

Mr. Johnston, in his admirable paper concluded on another page of this issue, like other telephone men who are near to the horn of the phonograph, seems to be not entirely free from the impression that a continuance of the combination process, along the lines it had begun to follow in a certain locality before it received such a decided set-back as has come upon it, would mean a return to earlier monopolistic conditions. We are reminded of some incidents in connection with territory which was once so thoroughly "sublicensed" by a zealous forwarder of the single system idea that his system for a time was going through antics analogous to those of the shark in the South Seas, who followed a ship too closely, and gobbled up a hot brick wrapped in cloth instead of the refuse food which had hitherto come his way. The chaotic condition of a large company which might absorb all of its competitors can indeed be better imagined than described, but in the telephone business, as it now is, the consideration of such a condition is of little practical value. It is safe to say that it is one which cannot be brought about. Some of the reasons against it which are not commonly stated have been very ably set forth in both the present installment of Mr. Johnston's paper, and the first part, published last week. A particularly significant point which we have not before seen mentioned in print is that the competitive efforts of Bell and Independent companies have, in combination, resulted in bringing into the telephone business funds from local sources, and from the large financial centers—a most valuable result to the public which profits from a maximum extension of the systems. It is unfortunate that considerations of space made it necessary to divide this paper for publication, as much of the force of the last part is lost unless it is read in connection with the first section.

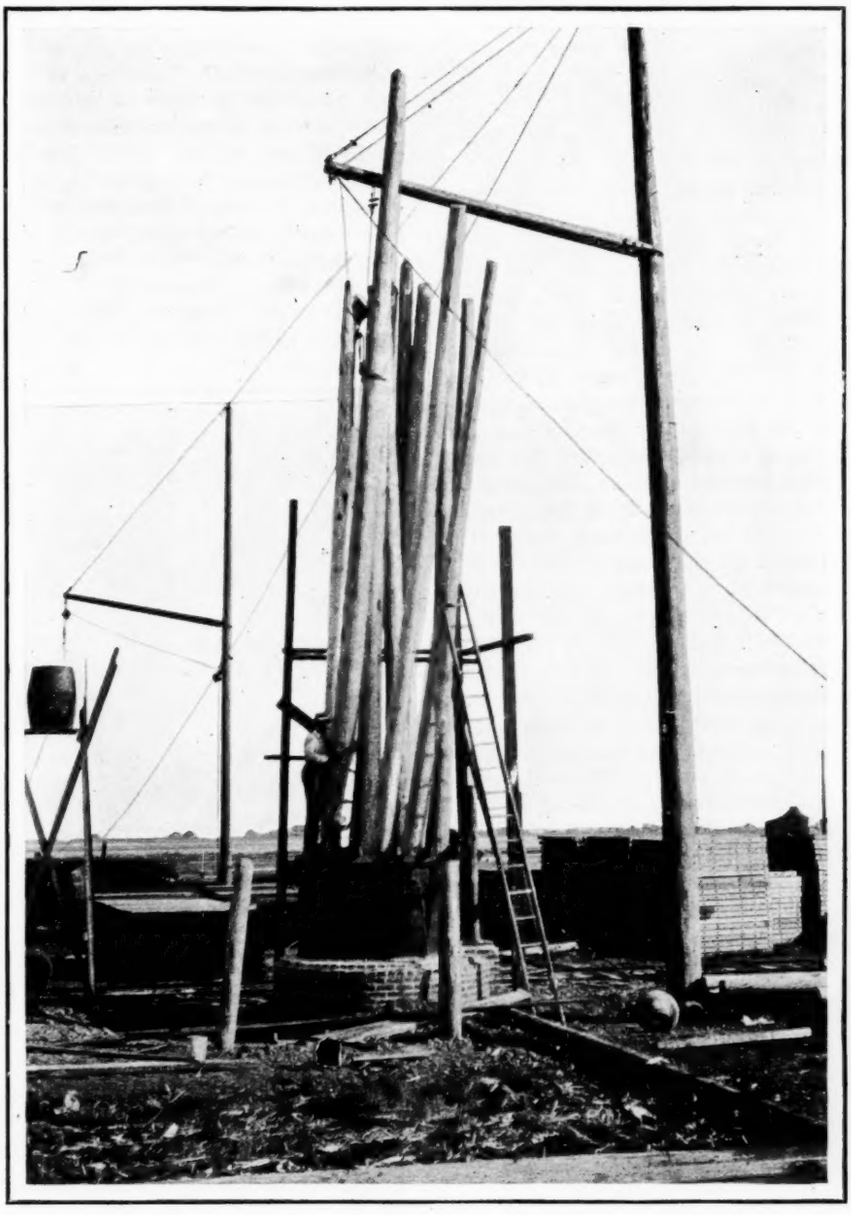
This whole paper is not only exceptionally well worth the careful perusal of telephone men, but should be widely distributed among the thinking public.

Wood Preservation, With Particular Reference to Telephone Poles*

By W. F. Sherfesee

Chief Office of Wood Preservation, U. S. Forest Service.

The preservation of structural timber from decay has been made the subject of careful study by the Forest Service for many years. It has been recognized all along that the preservative treatment of wood is distinctly a matter of dollars and cents. The questions with which we are concerned have to do with the supply of poles and other timbers used in telephone-line construction,—with methods of prolonging their life so as to secure the greatest possible service from a given amount of timber and at the least cost; and finally with the chances for substituting other and more abundant kinds of wood for the comparatively few species used at present for poles.



Butt Treatment of Poles in Open Tank.

It is each year becoming more difficult to secure an adequate supply of pole timber at reasonable price; and the replacement of the poles now in the line, when in a few years they must be removed because of decay, a becoming ever a more and more serious problem. To be sure, during the past year the supply of poles considerably exceeded the demand, but such a condition was purely temporary and due to the enormous curtailment of construction work brought about by the financial stringency throughout the entire country. The Forest Service reports show that, in 1906, 3,574,666 poles were purchased at a cost per pole of $2.65 at the point of purchase. Nine-tenths of the poles were cedar and chestnut, cedar forming about three-fifths and chestnut over one-fourth of the total number. Under natural forest conditions a cedar tree requires about 200 years to grow to pole size. When set in the ground, untreated, the poles last on the average between 15 and 16 years; hence, if the supply is to hold out, 12 trees must be growing in the forest for every cedar pole in use today, not considering the great number used for new construction.

A number of years ago the Forest Service realized that unless more conservative methods were adopted, a serious shortage of the better grades of structural timber, and a decided increase in their price would be inevitable. Steps to forestall or meet such a situation involved a study of the artificial preservation of wood from decay and insects. It was necessary to find out first whether the prevention or retardation of decay was possible; if so, whether it could be applied to practical conditions at a reasonable cost and with commensurate returns; and finally to ascertain the cheapest and most efficient antiseptics for preserving the timber for different conditions, the simplest and most satisfactory processes for injecting them into the timber, and the cheapest and most efficient type of plants for applying them.

No great advance in preventing decay could be expected until it was known just what decay is, and just what brings it about. Decay is now known to be due to the activities of low forms of plant life, called fungi, which permeate through the wood structure, abstracting their foods from the wood cells and leaving wood disintegrated and

*Abstract of a paper presented at the Convention of the International Independent Telephone Association, December 2, 1908.

discolored. Spores, which may be described as very primitive substitutes for seed, are borne by the fungi in countless numbers. They are far too small to be seen without the aid of the microscope, and, being carried freely by the wind, are everywhere present, ready to attack any favorable surface of wood on which they may happen to alight. Few species of fungi can successfully attack a living tree, and only a comparatively small number can attack and destroy wood in any condition. Yet the spores of some of these wood-destroying fungi find a lodging place in dead portions of a tree, or in cut timber, and if the wood is moist and in the right condition for the spores to grow, they germinate and send out thin, white threads which by repeated drenching pentrate and destroy the entire structure of the wood. These are the real agents of decay, and the success of wood preservation is directly proportionate to its ability to render and keep the wood unfit for their germination and growth.

There are four essential conditions for the growth of a fungus. It must have requisite amounts of food, air, moisture and heat. If any of these is lacking, or is insufficient in amount, the fungus cannot develop, and the wood will be preserved indefinitely from decay. The necessary heat is supplied by all temperate climates and it is only in rare cases, as under water, or deep under the surface of the ground, that air can be excluded. When freshly cut wood is exposed to the elements in its natural state, the sap contains sufficient quantities of food and water for the development of the fungi. Clearly the supply of air and heat are beyond control. But the moisture content of the wood may be reduced so low as to prevent the germination or growth of the fungi, and the food supply may be poisoned. All of the efforts to promote wood preservation are based upon one or both of these lines of action. Seasoning the timber, or reducing its moisture content, is the simplest method of prolonging the life of timber, and it is efficacious so long as the amount of moisture in the wood is kept below the requirement of the fungi. But moisture will be eventually reabsorbed from the atmosphere, or from the soil, and the old conditions partially or completely restored. A thorough seasoning of the timber is of the first importance for several reasons. It increases its durability, adds greatly to its strength, decreases its weight, and hence the cost of hauling; and, most important of all, renders it more porous and in a better condition for more permanent methods of preservation. Considered by itself alone the seasoning of a pole would more than pay for its cost, and in most cases merely represents the interest on the money invested in the timber for the time required by the seasoning process. Sometimes an extra handling is necessitated, but in almost every case the saving in freight will more than pay for the cost of seasoning, irrespective of all other advantages. But, as has been said, moisture can be excluded only temporarily. It will be reabsorbed when the timber is brought in contact with damp soil or air.

The only permanent way to prevent the development of the wood-destroying fungi is to poison their food supply. This is done by injecting antiseptic substances into the wood and so changing the organic matter from food suitable for fungi into powerful fungicides. Of the many antiseptics which at one time or another have been proposed for the preservation of timber, two general classes may be made: (1) antiseptic salts of various substances, such as zinc chloride, corrosive sublimate, copper sulphate, etc.; and (2) antiseptic oils of which creosote, or dead oil of coal tar, is most generally used. Copper sulphate has fallen into almost total disuse for preservative purposes in this country; and corrosive sublimate is used only to a comparatively very slight extent. The most common preservatives in general use are zinc chloride and creosote. Each has its advantages and disadvantages. Each has its own special field of usefulness. An extended discussion of their relative advantages and shortcomings is impossible here. Both are excellent antiseptics. It may be said, however, that the principal value of zinc chloride is found in its cheapness and its ease of transportation, for it can be hauled in the form of a solid and dissolved at the treating plant. Moreover, timber treated with zinc chloride will soon be in a condition to take paint, which is not true if creosote is used. The principal defect of zinc chloride is its liability to leach out of the timber when exposed to moisture, either in the soil or in the atmosphere. It readily dissolves in water—indeed, it is injected into the timber in the form of an aqueous solution, and so its subsequent leaching out is merely a question of time, and the wood is left once more subject to attack. Creosote, on the other hand, is practically insoluble in water, and so, when a high grade of oil is used and injected into the timber, decay will be postponed almost indefinitely. Its principal disadvantages are its higher first cost, as compared with zinc chloride, and its limited supply. But for the treatment of timber for many structural purposes there is no other preservative which gives good promise of replacing it. This is particularly true in regard to the treatment of poles. The thing to do, therefore, is so to use it as to insure the greatest returns from the expenditure of a given amount of money. In other words, to devise the cheapest and most

Butt of Pole, Showing Section Most Subject to Decay.

efficient processes and types of plants for injecting it into the poles. It is along these lines, so far as concerns the treatment of telephone poles, that the principal activities of the Forest Service have been exerted. Processes have been devised or adapted for the cheapest, most uniform and effective injection of the preservative, and types of

treating plants have been devised, best fitted for the application of these processes under the actual conditions which are encountered in the field.

The processes in use in this country might be divided into two classes,—those in which the preservative is injected by artificial pressure, and those in which the atmospherical pressure is made to force the preservative into the timber. Needless to say the latter, or non-pressure or open-tank process, as it is sometimes called, is much the simpler and less expensive. When timber is to be creosoted under the usual pressure method—or Bethell process as it is called—it is placed on iron trucks and hauled by cables into large steel cylinders, capable of withstanding high pressure. The doors are closed, and the timber is subjected to a bath of live steam for several hours. This is followed by a vacuum, and finally the cylinder is filled with creosote, the force pumps are started, and continued until the desired amount of oil has been forced into the timber. The surplus oil is then run out, the doors opened, and the treatment is complete. Thus the treatment is divided into three subsidiary processes—first, the steam bath; second, the vacuum, and third, the injection of the preservative under pressure. It remained to be found whether all of these processes were essential to a proper treatment, or whether they could be replaced by simple and cheaper methods. I have not time to trace the steps or to recount the experiments which were made in this effort. It is enough to state that the results were that air-seasoning was found to be more satisfactory in most cases than the bath of live steam, and that the vacuum could often be dispensed with altogether. There remained merely the question of pressure.

Allowing the oil to seep into the wood without pressure of any kind was slow and unsatisfactory; and yet the old artificial pressure required expensive plants and machinery. A happy solution was found by making atmospheric pressure to take the place of force pumps. To Dr. Charles A. Seely, of New York, is due the credit for having introduced this principle of treatment into America in 1867. His application of the method has been improved by the Forest Service and adapted to more wide-spread conditions. During the process of air seasoning much of the moisture in the wood cells is evaporated and its place is taken by air. The wood structure becomes more porous and more easily penetrated. Having reached, or closely approached an air-dry condition, the wood is placed in a bath of hot oil, or other preservative. This application of heat causes the air in the wood structure to expand and much of it is expelled. Some of the moisture remaining in the wood is also evaporated and escapes. After a time the hot liquid is run out of the treating tank and cooler oil admitted; or else the timber is removed from the hot bath and quickly plunged into one of lower temperature; or, by a third method, the heat may be shut off and the timber allowed to remain in the oil as it cools. This quickly causes a contraction of air and a condensation of moisture to take place within the timber; a partial vacuum is consequently created and the preservative is forced into the timber under atmospheric pressure.

(To be continued.)

Telephone Combination: Would It Serve a Good Purpose?

By Gansey R. Johnston

As human nature is divided, it is probable that that business is best fitted to obtain proper management which offsets against large organizations a number of small separate organizations. The one will afford opportunities to the routine-lovers and the other to the freedom-lovers. In so far as the telephone business needs conservation, the former are its good servants; in so far as it needs development, the latter are its source of strength.

At this point it may be rejoined that the foregoing argument contains little or no more than might be urged against any large combination of interests. There are contrary arguments from the standpoint of such interests which it, therefore, becomes necessary to consider. The general run of these does not apply to the telephone business. The principal reasons for the formation of combinations have been in the resulting economies. The existence of damaging or ruinous competition has been rather the occasion than the cause of so many competing interests in other lines getting together and joining their fortunes.† It is only here and there on a small scale in the telephone business that the competition has been damaging and very seldom indeed has it been ruinous. There has been more damage from panic than from either attack or defense. Competition, as it its nature and purpose, has taken away from one or another, their ungrasped opportunities, but not, in this field, their developed business. No sufficient ground is presented for believing that telephone combination, on the whole, offers any economies. The unit of local telephone service, namely, the subscriber's line, does not diminish, but on the contrary increases, in cost as the number of units increases on a given system. The business is in a state of underdevelopment. What the situation may be when it is well developed by the competitors cannot be foreseen, because with the commercial development is also proceeding an inventional development that promises to change completely some of the important conditions of the business.

I may comment upon some of the economies usually urged in favor of industrial combination:

Saving of advertising, traveling men, and other sales expenses.

The telephone business has borne very little cost of this sort.

Saving of losses through unwise credit accepted because of competition.

The telephone business extends no such credits.

Utilization of all working machinery by closing particular plants when the demand for the product is diminished instead of running all plants on part time.

The telephone plant may not be shut down.

Carrying one large stock instead of a much greater stock in the aggregate scattered among the competitors.

There can be no accumulated stock of telephone service.

The general study of the market, so as to adapt the production to the demand and avoid overproduction.

There is no opportunity of this sort in the telephone business.

The saving of unnecessary freight charges resulting from cross-shipments.

*Continued from the December 26 TELEPHONY.

†Such competition has often been initiated by those planning combination, for the sake of bringing others to join in such plans. Some of the Bell companies have at times directed such tactics against competing companies—more often than otherwise unsuccessfully.

The telephone service ships nothing.

The standardization of methods and materials.

It is believed by many in the telephone business that standardization is not nearly so desirable as further experimentation. It is thought that inventional prospects are too great to risk their stoppage through any strictness of standards.

The saving of expense of general officers.

It is possible that a combination could reduce expenses on the whole by cutting off local directors and reducing the average pay of local managers, even after making allowance for additional general officers—executives, auditors, inspectors, engineers, experimentors, and friend-makers. But in so doing the organization would be weakened where it needs the greatest strength, namely, in the cities where the business is done.

The spreading of the hazards of business over a greater number of plants, so that uninsurable losses from interruption of one plant may be divided among all the plants in the combination.

This is not such an advantage as can be expected to be transferred to the public. Competition tends to equalize the public losses under such circumstances as much as combination. In telephone service, it is only the existence of competing plants in the same community that offers the public a measure of relief from the hazards of the business.

The telephone business is not one that involves much of legal expense. It causes, for example, very few personal injuries.

There is no need in the telephone business for any centralized power to steady prices at a remunerative level. If combination would open a new field of competition, it would thus make for unsteadiness of rates.

It is very doubtful whether a combination would furnish a better market for securities. A good market for securities that are not essentially secure, is not in the public interest.

The president of the American Telephone and Telegraph Company, in his annual report for 1907, argues against telephone competition. He does not express the purpose of this argument, going no further than to suggest that if there is to be no competition, there should be public control. It may be presumed that the argument is not an academic one, and that the Bell company has some purpose in making it. One of its purposes, manifestly, is to discourage the construction of additional competing plants in those cities where it now has monopoly, as in New York, Boston, Washington, New Orleans, Cincinnati, and others. The president of the Central Union Telephone Company, in his annual report for 1907, expresses the obligation to continue the endeavor to consolidate and unify the exchange systems until the field is clear. This may express a purpose to gain possession of all the plants, or to divide the local territory, so that one interest has a monopolized plant in one place and the other in the next. It may be that the plan proposes only to acquire a second or competing connection for toll purposes with existing local plants in places where the Bell company has no plant or only a small plant. Another purpose may be to bring about connections between the local competing plants. Then, as would appear to be the natural result of such connections, the Bell company may intend to acquire, or otherwise combine so as to control, the toll lines of competing companies.

Taking up these various purposes, it can be shown that each is open to the objection to the combinations that have been advanced above. If the reasons for establishing competing telephone plants in important cities heretofore have been sound, most of those reasons are still applicable for the establishment of competing plants in cities not now enjoying competition. As the need for development is diminished through the development that is brought about by the potential competition, the improvements and economies in telephone construction and service become more valuable, and the opportunity for lower rates greater. If it be true, as set forth below, that public interest is against the combining of toll line companies, then the continued separation of the toll line interests offers an additional reason for a separate local system in the cities not now getting service from the non-Bell local exchanges and toll lines.

The argument against the duplication of plants is of no avail against existing duplication. To consolidate and unify existing systems is a present expense, not a saving. It would save little in future construction, for the reason that the parts of a telephone plant duplicated by a competing plant are the more fixed parts and those which are capable, ordinarily, of being accommodated to future growth without addition to themselves.

A division of territory between different monopolized telephone interests, besides offering little or no savings, has not much better standing before us than the occupation of all territory by one monopolized interest. If the local monopoly should be left in control of local interests, the objections of the public, the action of municipal or state authorities, the upbuilding of new competition, might be somewhat later in making themselves felt, but they could not be long prevented. These troubles would be hastened if the local interests were not truly in control of a given plant or if the interest of local investors should, in process of exchange, be vested in general instead of local telephone securities.

There have been no tests made on a sufficient scale to display conclusively the result of interconnection between competing local or long-distance telephone plants. It appears, however, from a study of the business, that such connection would be certain to result in ultimate monopolization. Either the motives which led to the connection voluntarily would lead to further mutual agreement to the disadvantage of the public; or the forcing of the connection, as by legislative enactment, would force one company into the hands of the other. To work together at all for a completed toll message necessitates almost a complete degree of harmony. A telephone message does not mean simple transmission by the agents of the company at their own best advantage. It means putting the necessary facilities at the exclusive command of the users for a given time. It involves the use of two local lines which must be otherwise free, the reaching by these lines of the two parties desiring to talk, and the attentive services of two or more operators. The difficulties and delays in getting all of these conditions simultaneously are so great that the average toll line does not take care of more than four or five messages an hour, though it might be trebled for the shortest, simplest traffic. The questions of credit and details of accounting involve time and expense. It is not thought that messages can be handled between two local companies on a toll basis and the payment secured at so small a charge as five cents. While a large number of messages coming from the same customers could be handled on an average for less, there would be very few telephones yielding many such local tolls. An average of one to three a day would pay for the competing telephone. There is a very questionable demand for such service. Those who are overlooking their benefits and are disposed to complain most of the competing telephones under the notion that multiplication of residence telephones forces them to an extra subscription,—for example some smaller business houses—would find themselves under equal necessity to maintain both telephones with a system of toll connection between the competing exchanges. The cause of the so-called forcing of a telephone upon a business place is the offer of purchase orders or other incoming trade through the telephone. If such a business house is in a competitive line and takes the stand that its own incoming telephone calls must subject the caller to a five- or ten-cent tax for each call, it would see its competitors whose two connections require no tax getting the business. Thus the dual connection would bring few regular advantages to any considerable number. The occasional needs for such connection are met by the comparative accessibility to all members of

the public of both telephones. The telephone companies, in face of all the difficulties of furnishing, accounting, and obtaining pay for cross-connections, would be obliged, in order to keep themselves even, to charge a prohibitive price.

If this position is disputed and it is argued that plans could be worked out in such wise that a telephone on one system would be equivalent to telephones on both, or that the user would be indifferent as to which telephone he might subscribe for, then the objection presents itself that the companies would become indifferent and accordingly would cease their development. The subscriber on one system would obtain the benefit of connections with those on the other system, but he would lose his expectation of obtaining connection with the remainder of the public that competition for business now promises to secure for him.

After viewing the possibility of the plan working economically and effectively, and combining with this the supposition that the public demand for additional telephones is not to be denied, the question arises how that demand would be met by substantially equal division between the two systems or a preponderance in favor of one. Competition in the telephone business, as in other businesses, is based upon certain differentials between the competitors. If two telephone companies come to offer the same number and class of connections, local and long-distance, they have given up their principal differentials. As soon as competition in price should be seriously felt, that would be adjusted. Then the competitors would be in that condition where a small difference in favor of either would work to the end of giving that one all the new business and, gradually, the old business. Such a difference would almost certainly be the difference represented by the larger number of rental connections, as distinguished from the larger number of toll connections. The smaller or weaker company would gradually be starved out of business or compelled to turn its plant completely over to the winning company. It is possible, it may be said, that before the approach of this condition of compulsion the harmonious working together of the competing interests would lead to the removal of the personal obstacles and permit consolidation to proceed.

If we have an effective argument against telephone combination or telephone monopoly, such argument applies with equal force against connection between competing local telephone companies.

The same may be said of the effect upon the long-distance companies of compulsory connection. It is a fallacy to call a connection between long-distance companies an interchange of business and assume its analogy with interchange of telegrams by telegraph companies or cars by railroad companies. These have their messages or cars under their own control. It was thought at one time that railway tracks should be opened to any one who might choose to send his own trains over such tracks. This plan was found to be entirely impracticable. The theory of connection between competing telephone companies involves these same difficulties, with the addition that the passage of a telephone message requires the exclusive use of the circuit from end to end. Co-operating toll telephone companies have difficulties enough in providing for their use of circuits. Competing telephone companies could not successfully use the same circuits, except on the assumption that the very last shred of competition is broken. If competition is banished from the toll line business, then a very large differential in favor of one or the other of competing local companies is established. The inevitable tendency would be toward final monopoly.

If the competing toll companies come by legal action or agreement to connect with the same local companies and compete or pretend to compete for their originating toll business, then would appear truly the conditions that lead to combination. All the traffic to common points would be ostensibly on the same footing, but subject to the caprice or side interest of the routing man or men in each local company. The toll business up to a certain point—soon reached, however,—is one of increasing returns. If that point is not reached, then there is saving in combination. If the demand for service over-reaches the facilities (as it does largely in the present stage of toll line construction) and the division of traffic is governed by other causes than the relative facilities, then neither company has the motive for additional construction. When the need becomes imperative, they will join hands in construction and division of profits. Many manufacturers and others have gone into combinations against their own judgments and convictions of right because of their inability to contend against what they deemed unfair legal restrictions or commercial methods.

The telephone service is divided into three general classes; the local business, the local toll business, and the truly long-distance business. The latter appeals most strongly to the imagination, but it is of little commercial or social importance. This is largely because it is in a comparatively recent stage of development and has a comparatively efficient and very much cheaper substitute in the telegraph. For long distances, telephone messages may be very largely classed as occasional messages. There has been little development of regular classes of traffic over long-distance lines.

The local telephone traffic is the most important in respect to meeting the greatest public need—the ordinary, every-day requirements of the local population, with their multitude of family, social, and business needs for intercommunication. The local calls number from ninety-five to ninety-nine per cent of the total telephone calls.

The next most important is the short-haul toll business. This takes care of a large amount of social communication, but its most important function is the carrying of business communications to and from the natural centers of trade. This applies more particularly to those places which are connected with the trade center by quick means of transportation. Those who can thus get their supplies quickly, learn to depend upon the telephone for the obtaining of prices, inquiring as to stocks, and the placing of orders. The telephone, for their purposes, is more effective, quicker, and cheaper than the telegraph. To those beyond the range of quick transportation, the need for more foresight in placing their orders tends to induce enough additional foresight to permit them to transact their business by mail or the cheaper medium of the telegraph. The company operating toll lines substantially throughout Ohio and handling inter-county business, so that its shortest haul is practically from county seat to county seat, finds its average haul hardly twice the distance from one county seat to the next.

As previously stated, the telephone traffic beyond these trade limits, so far as it has been developed, is very largely occasional traffic. Yet it is this long-distance business that assumes to dominate the entire telephone business. It differs from the telegraph business. This is supported by its regular classes of traffic, among which may be mentioned the dispatching of trains, the newspaper service, the market service, and various forms of speculative business. The occasional use of the telegraph for social and business purposes yields a very small proportion of its revenue. The telegraph interests in this country have never attempted to popularize the service by cheaper methods of transmission and very low rates. We are not accustomed to think of the telegraph business as having progressed rapidly, but it appears that it has done more to economize its handling of messages and to utilize invention than has the long-distance telephone service. The latter requires two wires for a single message, the former will send four messages simultaneously over the same wire. Two telephone wires will take care of four or five messages in an hour, while two telegraph wires will accommodate three or four hundred. Just how much farther the telegraph service may progress we do not know, nor can we point out just the direction in which telephone service may be improved and cheapened, but it seems

fair to believe that the telephone service will be greatly changed from its present condition by continued subjection to the forces of competition.

If our analysis of the relative importance of the different classes of telephone service is correct, then it may be urged that an attempted combination of the telephone interests of the country into one centralized system would be unique. There are many things about the local telephone service that distinguish it from any other class of business, so that its problems have to be studied on their own merits and not disposed of by assumptions of analogy with other forms of business. When we come to consider the combination and monopolization of the telephone business we find again that it must be studied on its own merits, because it lacks the elements of analogy with any other combination that has ever been successfully made. The business was monopolized under substantially one control through that period when the powers of the United States government could be invoked to defend its monopoly. With this start combination has not fallen to pieces with the termination of monopoly; but it is hardly meeting such degree of success in comparison with its multitude of rivals as to commend it for a nucleus of a revived monopoly.

A notable condition of the telephone industry is the constant demand for new funds to meet the development expected by the public. A telephone plant is expensive and almost entirely fixed in its location, while its value as a working plant depends in considerable degree upon the proper location of its poles and circuits. There have been comparatively few losses in the business by reason of mistaking locations, because of the fact that the demand for service has in nearly all cases run beyond the supply of lines. In providing new lines to meet this demand in competitive territory, the general funds of the Bell company and the local funds of the Independent company have been available. The competition has forced upon one or the other of the companies reasonably prompt action in the endeavor to keep up with the demand. Under the conditions of telephone construction and operation, the interest of the telephone company, with any given rate for the rental of its lines, lies in the restriction of the number of such lines at a certain point of greatest return. Competition, as a rule, has forced the companies to go far beyond that point before obtaining public approval to an increased rate. Such competition, it will be observed, not only compels greater energy and greater study of economy, but also the permanent investment of large sums of money. The Independent telephone companies have been getting their funds very largely from local sources. The Bell companies have obtained their funds very largely from the parent company, which has in turn obtained them through the New York and Boston financial centers. *As the business has grown, and increasingly large sums have been required and the margin of profit has become less, the American Telephone and Telegraph Company has found considerable difficulty in securing sufficient funds for further financing of its different subsidiary companies. Some of these funds have been expended, to all appearances, unnecessarily and unwisely in the attempt to prevent or eliminate competition. It has not prevented such competition. In fact, on the whole, the company has not held its own in the measure of relative advance. It cannot, therefore, be held up as an example of a truly successful telephone combination.*

The Bell interests originally lost their opportunity to supply the public demand for telephones. They found themselves outclassed in public favor by competitors having a better regard for public needs, and, as the demand for expenditure has increased, they have found their credit strained and their ability to continue to finance their properties in question.

It is conceivable, apart from our conjectures, that the purpose of the American Telephone and Telegraph Company, in seeking to make alliances with competing telephone interests and to unify and consolidate the exchanges, is to put a drag upon the business so as to diminish the necessity of continued new investment. If the American Telephone and Telegraph Company is finding itself in that position where it feels obliged to stand still or make progress slowly by reason of insufficient funds, then it may be working to get its competitors at a similar standstill. I should hesitate to suggest this as the policy of that company were it not that such a policy would fairly match its practice of spending for contention against the idea of competition large sums that it might have spent to many times the advantage in a legitimate expansion of its own business.

Summing up, it may almost be said that every argument we have noted against monopoly in general can be applied against telephone monopoly, while few of the arguments in favor of monopoly can be applied in favor of telephone monopoly. There are many special reasons against such monopoly. There is one special thing to be said in its favor; namely, that it would tend to unify the service. This tendency may be admitted, but it is not admissible that such unification is worth its costs, in its tendency away from competitive prices, competitive service, and competitive commercial and inventional development.

Economical Development of Toll Territory*

By Frank F. Fowle

The operating methods for handling toll traffic are exceedingly numerous, but they differ among themselves in only a few fundamental respects. It is not possible here to make an exhaustive analysis of these methods, but a summary will be given of their characteristic features. Traffic between points connected by direct circuits is commonly called terminal business and traffic between points not so connected is called through business; the latter is also called switched or relayed business, according to how it is handled at the switching offices. The principal methods are as follows:

I.—Direct ring-down, in-and-out ticket method. The operators signal each other by ringing on the toll circuit and pass calls and reports to each other over the circuit. They are without means of communication when the circuits are all busy, except via other routes. Each operator makes out a full ticket and the operator at the originating office establishes the connection, times it and supervises it.

II.—Morse ticket wire, in-and-out ticket method. In addition to the toll operators there are two "Morse" operators, one at each end of the toll circuit, who have a "Morse" circuit between them. All calls and reports are passed "by Morse." The toll circuits may be cleared by ringing, or ordered down "by Morse." The toll operators do not use the toll circuit for calls or reports; each operator makes a full ticket and the operator at the originating office times and supervises the connections. Communication between the toll operators is possible at all times by Morse.

III.—Direct ring-down, outward ticket, double track method. Requires at least two toll circuits and preferably

*Paper presented at the Convention of the International Independent Telephone Association. Continued from issue of December 26, 1908.

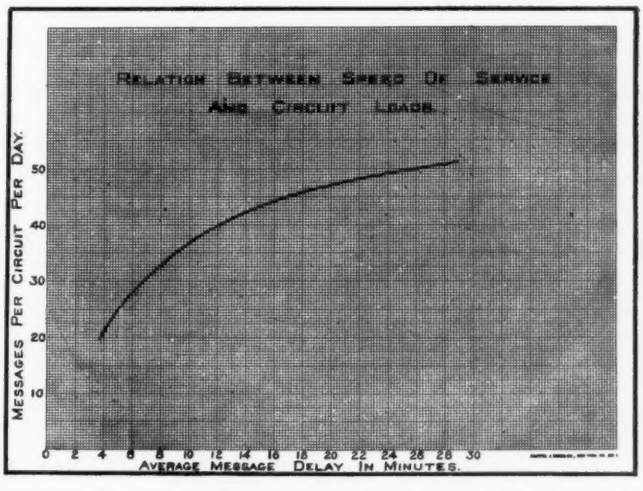
more. The operators signal each other by ringing on the toll circuits. The circuits are divided into two groups, one for traffic in each direction. The inward operator makes no ticket or record whatever, but merely switches up the local line of the party called for to the toll circuit and cuts out until a clearing-out signal is received. The outward operator, at the originating office, deals directly with the party called for at the distant end of the toll circuit, makes out a full ticket, times the connection and supervises it.

IV.—Telephone order circuit, outward ticket, double track method. Requires a group of circuits, preferably ten or a larger number, double tracked. An outward operator reaches an inward operator, at the distant end of the toll circuits, over the order circuit and passes the distant local number wanted; this is obtained and assigned to an idle toll circuit by the inward operator, who advises the outward operator of the assignment so that she may take it up. The outward operator then deals direct with the distant party called for, establishes the connection, times it and supervises it.

Method I is used by companies which interchange business with other companies, the inward ticket being used by each auditor as a check upon the revenue statement of the other company. Wherever possible, however, the inward ticket should be abolished, or made out in only the briefest memorandum form, so as to economize in circuit use and operators' time.

Method II is designed to secure high circuit loads on toll circuits worked in small groups; it is not especially fast. It is unsuitable for short haul business, and can only be justified when the increased revenue from the higher circuit loads more than compensate for the expense of the "Morse" operators; this naturally implies moderate to long hauls, where the average revenue per message will be high. Method III is suitable for short haul business wholly within the territory of any one company and will give superior operator loads over the previous methods; for very large volumes of traffic Method IV is preferable. Rigid division of a group of circuits into two parts for double tracking purposes is inadvisable, especially in small groups. The larger the size of a group, the greater the efficiency of the individual circuits, that is,—the higher circuit loads they will bear. Double-tracking may therefore reduce the maximum permissible circuit loads; this can be offset to some degree by making a flexible division, some of the circuits being reserved for use in either groups as may be required at any moment. Suppose there are eight circuits numbered from No. 1 to No. 8; the outward operator at one end may be instructed to commence the assignment of connections on No. 1 and proceed in order toward No. 8, the outward operator at the other end being instructed to commence assignments on No. 8 and proceed in reverse order toward No. 1, there being no rigid division of circuits into two groups. If traffic at any moment is heavy in one direction and light in the other, this method of double tracking lends itself readily to the temporary condition and maintains high average circuit efficiencies. The foregoing methods are described as applicable to business between offices connected by direct circuits. When there is not sufficient traffic between two offices to warrant even one direct circuit, the business must be handled over a circuit built up through one or more intermediate offices, sometimes called a tandem circuit. At an intermediate office the operator connects an incoming toll circuit from the originating office to an outgoing toll circuit to the office desired or the next intermediate office en route. If the intermediate operator makes no ticket the connection is termed a straight switch, and if the operator makes out a through ticket the connection is termed a relay or ticket switch. So far as possible through business should be handled on a straight switch basis, to economize both in circuit time and operators' time. At offices where the lines of two or more companies are switched together, switch tickets serve as a check upon the reports of the originating offices. Operating Method No. I is most commonly employed for through business; Method No. II may be applicable in case an economical layout of ticket wires can be devised.

The choice of proper circuit loads, in terms of messages handled per circuit per day, is a matter which involves both the average speed of service and the load factor. This is a point of view which has not, perhaps, been previously advanced: but it is the purpose to show that this is the correct view and that any other view disregards the relation which exists between the revenue per circuit mile, the average speed of service and the load factor. The consequence of giving too fast a grade of service, for a fixed rate, may be not only the cancellation of profits but an actual net loss; on the other hand, the consequence of attempting to indefinitely increase the revenue per circuit mile, with a fixed rate, may so impair the speed of service as to cause serious congestion of traffic and loss of patronage. As regards the load factor, first, it will be conceded by all that the more even the load curve the more even will be the speed of service; that periods of suddenly changing demand cause uneven service. A high load factor corresponds to an even load curve without prominent peaks or abrupt changes of large magnitude; it corresponds therefore to an even grade of service as regards variations in speed, and the average speed of service (or average delay) will be as nearly as possible representative of all the service as a whole. A low load factor corresponds to an uneven load curve with prominent peaks and large, abrupt changes in demand; it corresponds therefore to an uneven grade of service, fast during the periods of small load and slow during the periods of heavy load, the average speed being very poorly representative of the service as a whole. It is submitted as a fundamental proposition that with a fixed average speed of service the circuit loads diminish as the load factor diminishes. It is also submitted as fundamental that with a fixed load factor the average speed of service diminishes as the circuit loads increase. Granting these, it follows that with fixed circuit loads the average speed of service diminishes as the load factor diminishes. There is an opportunity for considerable original investigation in determining the exact values of these relations, under different rate schedules, and different operating methods. The results of one such determination are given in Fig. 8, which


Relation Between Speed Of Service And Circuit Loads.
Messages Per Circuit Per Day.
10
20
30
40
50
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Average Message Delay In Minutes.

Curve Showing Increased Delay Corresponding to Larger Loads.

expresses the relation between the circuit-mile revenue per week day, Saturday excluded, and the average speed of service; the load factor was approximately 30 per cent and the traffic was handled by operating method No. III.

The values which have been used hitherto for circuit loads, by different traffic managers, have not been in agreement at

any one time, and have changed, moreover, from time to time. Unfortunately the values in use at various times have not been stated in conjunction with the average speed of service which obtains with particular load factors. Certain service standards have been stated in some cases, but they were impossible of attainment under the circuit loads prescribed, and

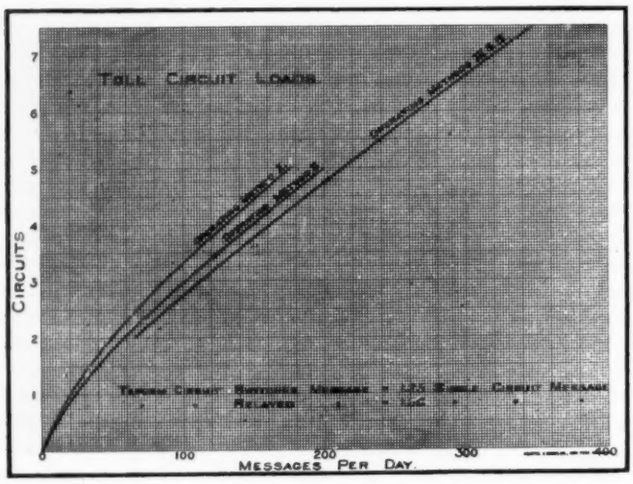


Fig. 9—Circuit Loads Under Different Operating Methods.

the load factors which obtained. Practically every one is in agreement on the statement that for a fixed speed of service, and a fixed load factor, the circuit loads increase slightly as the number of circuits worked as one group between two given offices increases; in other words, the larger the group the higher the efficiency of the individual circuits composing the group. A complete explanation of this last principle can be made by the use of the theory of probability as applied to telephone traffic, but the statement must be accepted without further proof here. Fig. 9 shows, in the form of curves, some circuit loads which will give fair service with a load factor of about 30 per cent; three curves are shown, one for each operating method except the fourth, which permits the same loads as the third. These loads are wholly on the basis of particular party business; two-number business will permit somwhat higher loads. Within the boundary of a zone whose telephones are not too numerous to be published readily in a single directory, the two-number basis is the most economical one, and should be used on all short haul, low rate business. Very fast toll service implies low circuit loads and high rates, on the assumption that the business is profitable; and therefore it is contrary to the principle that a public service corporation should seek a maximum development. Extremely high circuit loads are equally to be avoided, because they imply very slow service, with consequent public dissatisfaction and loss of business.

Operator loads are quite secondary in importance to circuit loads, because the plant charges in a toll system are greatly in excess of the expense for operators' wages, and general economy depends upon securing proper and sufficient loads for the plant. This principle should be given special emphasis in the case of long haul business. While it is important to keep toll operators busy, it is more important not to overload them. A toll operator who is given more toll circuits to handle than she can keep busy, will consequently delay business and impair circuit efficiencies, causing losses which exceed many times the saving in the wages of an extra operator during the heavy load period. The requirements of toll operating are much more severe than are those of local operating and a high average of intelligence and alertness among the operators is necessary. The training requisite to produce a competent toll operator extends over a period of nine months to a year, when the candidate has not had previous experience. The loads which toll operators can handle depend therefore, to a degree, upon their length of service and consequent experience. It is nearly as important to maintain a high average length of employment among the operators as it is to distribute their loads properly. Specific loads for operators handling various classes of traffic must apply, therefore, to the average operator rather than to the individual; expert operators will do more, inexperienced or undertrained operators less. The following average loads are probably fair values:

Table of Operator Loads.

		Calls per Hour			
			Tandem Circuit		
Operating Method	Character of Call	Direct Circuit	One Switch	Two Switches	Three Switches
I and II	Outward	12	10	8	6
I and II	Inward	12	11	10	8
III and IV	Outward	24	20	..	..
III and IV	Inward	60	60	..	..
I and II	Straight Switch	..	36	24	16
I and II	Ticket Switch	..	8	..	..

Recording operators, 30 to 40 calls per hour.

In handling long haul traffic, the operators should be underloaded, on the basis of the above figures, in order that advantage may be gained in obtaining high circuit loads. It is important, for the same reason, to choose operating methods that give high circuit loads rather than high operator loads, when for any reason the necessity arises for a compromise. The general procedure of arranging the operating force to correspond with the traffic load is as follows: Compute from the traffic loads the necessary number of operators and supervisors to handle the entire traffic of the given office during each half-hour of the day. Next work out a schedule of operators' hours by cut-and-try methods until the curve or plot showing the number of operators at the switchboards agrees most nearly with the traffic load curve, as in Fig. 4 Due allowance should be made for absences, reliefs and vacations; and also for the force necessary to cover special positions, such as the chief operator's or manager's desk, the directory position, the rate position, the routing position, the information position, the delayed call positions, the service listening and supervisory positions, etc. In small offices these special positions can be grouped or bunched together; and in the very small offices there is, of course, no need for them.

(To be continued.)

Relation of the Exchange Owner and Operator to the Manufacturer and Supply Dealer.*

By C. W. Emmer.

At the start of the Independent telephone movement, who extended to the little, struggling operating companies the most substantial aid, and the most cheering encouragement? It was the Independent manufacturers and supply dealers, and so great was their help that none of us who took up the work in the early years will fail to recognize that it is only through their loyal support that we are able to exist at all. They have shown not only their ability, but their willingness to further all legitimate development of the operating companies to the utmost. It is obvious, then, that leaving out for the moment, the question of gratitude, self-interest alone ought to compel every Independent telephone man to purchase from the friends of Independent telephony exclusively.

It is only in very recent days that we have been able to purchase telephones or supplies from others than our friends and it would be well for every prospective customer of the enemy's allies to consider why it is now possible. A few years ago some one conceived the idea of buying up the control of a large, and, at that time,

*A paper presented at the Convention of the International Independent Telephone Association.

one of the very best telephone manufacturing plants in existence, and thereby obtaining the control of the source of the equipment for a considerable number of Independent telephone companies. Possibly the idea was not the property of the American Bell Telephone Company, but it looked very much that way, and the Independents so accepted it. Whatever harm might have been done was nullified by prompt action on the part of the telephone press, and the various Independent telephone associations. This plan miscarrying, the bold one of seeking openly for business among Independents, as well as from the public at large, by the Western Electric Company (the Bell factory) was put into effect, and agents were sent out to "show us how much better off we should be if we only had their equipment." As the majority of us are competing against the Bell companies who are using this same equipment, and beating them by giving a better service, and maintaining our plants in good condition at a less cost, this argument has fallen rather flat. But the Bell concern is still out for our business, and it is the duty of every loyal Independent to give our friends who are not in the Association a bit of advice when the occasion warrants.

There are, conceivably, two reasons why the Bell factory is looking for business outside of the Bell companies. The first one is that it increased its capacity so much a few years back that the lessening demand among the various Bell companies for equipment has forced it to pick up what business it can get to run its plants at full capacity so that it may turn out goods at a minimum cost. The other is that it hopes to force the Independent manufacturers out of business by reason of their not being able to meet the temporarily low prices it may make if it gets well established in the market. So far, there is not much cause to consider the last as being the correct reason for this change of front on its part, and it is very likely that the first view presented is the true one, coupled with the desire of the Western Electric officials to earn dividends. Viewing the very green fields of Independent telephony from the outside of the fence, with a longing to get their share of this new business, it is only natural to suppose that they finally prevailed on the American Bell officials to depart from the traditional policy.

Were it possible for the Western Electric Company to drive out the Independent manufacturers, we should indeed have a hard time competing with the Bell if we are to judge them by past history. No one can consider for a moment that any Bell interest wishes the Independent cause to prosper. Just bear in mind that they hope otherwise and the proper view of the question will be easier. Under those conditions we should be in the same boat as were the pioneer Independent companies. Perhaps there are some of you who were not in the telephone business then, and you do not see it as do we, who remember the sort of equipment the early Independents were obliged to use in competition with the then up-to-date apparatus of the Bell companies. The Bell factory harrassed the operator and the manufacturer in every possible way.

To cite just one instance, the Citizens Telephone Company of Grand Rapids was the very first to build a large exchange in opposition to the Bell, and after its board was installed, because of Bell patents, it was temporarily obliged to discard the cord weights on the board and substitute elastic to return the cords to their seats. No bridging bells could be used at that time, and a hook-switch patent prevented the hook from being used as at present to automatically make and break circuits in the telephone. For years no multiple boards could be used by reason of unexpired Bell patents. The American Bell Telephone Company fought the government hard to retain a monopoly of the telephone business, but, thanks to the manufacturers, it lost out. The manufacturers fought many cases on their own account, and the result is that any one can now compete with the Bell, giving better service by reason of his ability to purchase superior equipment. Surely no good reason exists for buying from the Western Electric (the Bell factory), or any other affiliated company save economy. And to economize in this way is the dearest form of extravagance. Don't think that you will always be allowed to purchase the same grade of equipment that is supplied your competitor!

It is now possible for almost any one to enter the telephone field, and I wish to say a word to those who have recently entered the Independent ranks and are buying equipment from the enemy "to suit themselves" as it has been expressed. They are told that they ought to buy where they can to the best advantage, and this appeals to a certain sense in some of them when the prices and terms are made so attractive as to shut out the Independent supply dealer and manufacturer, although their ignorance as to quality is the true explanation. They may not realize it, but their position is analogous to that of the non-union workmen who profit by the better wages and hours that their organized brethren have made possible for them by sacrifice and effort. I do not wish to accuse them of lack of principle, but I do accuse them not only of selfishness, but of lack of foresight, caused, undoubtedly, by ignorance as to facts and conditions.

It is the duty of Independent telephone men to patronize strictly Independent supply dealers and manufacturers. On the other hand, it is the duty of the manufacturers to see that the Independents do not suffer, by continuing, as in the past, to supply them with every possible improvement that they might be able to purchase from others, and meeting prices whenever possible, taking into account a reasonable profit. It is the wish of the writer that any members of this assemblage who may be purchasing goods from the allies of the enemy, turn in a list of these articles to the officers of this Association with a view to having the Independent supply dealers show whether they can not furnish Independent made supplies or equipment which will be better in price for the same quality, or better quality at the same price. This is quite generally the rule, as a careful investigation will prove. With the operator and manufacturer working together with the same spirit of harmony that they have mixed with their dealings in the past, there is no reason to fear the future of Independent telephony.

Church Services Heard by Telephone at Parkersburg, W. Va.

An interesting use to which the telephone may be put has just been successfully tried by the pastor of the First Presbyterian Church, of Parkersburg, W. Va. By means of the telephone, the people who are unable to attend the services are able to hear the sermon without leaving their homes.

This plan was suggested by some of the members of the congregation and as it met with general approval, arrangements were made with the West Virginia Western Telephone Company to give it a trial.

With the use of a special transmitter, installed on the pulpit immediately in front of the pastor, a perfect connection may be had with twenty parties. The company is given a list of those who are to have connections on Saturday. The connections are put up at a certain hour on Sunday morning, and left up until the services are concluded.

The plan has proven very successful, and may be adopted by other congregations in Parkersburg. The telephone company was warmly commended for putting this service at the disposal of the members of the congregation.

History of the Automatic Telephone*

By Arthur Bessey Smith

Assistant Professor in Telephone Engineering, Purdue University.

To provide for counting messages, in the Chicago system, a meter was attached to each first selector. It is shown in detail in Figs. 74, 75 and 76. Fig. 74 is a front view, showing the mechanism in its normal position. Fig. 75, shows the left side, normal, while Fig. 76 shows the left side while a call is being put through. The counter or message register proper consists of the ordinary collection of wheels and cylinders, so arranged that ten revolutions of one are required to cause one revolution of the next higher. The mechanism of this forms no part of the message register patent, taken out by the inventor, John Erickson, and has nothing to do with the principles described below.

On the end of the register proper is mounted a toothed wheel, 5. On the side of the wheel are ten pins, 6, each pin representing a completed call. The meter magnet, 7, has an armature, 9, to which is attached a lever, 10, carrying a pawl, 11. The pawl is normally out of contact with the edge of wheel 5, but is adapted to move it one notch when the magnet is energized once. A detent, 12, is adapted to engage the teeth of wheel 5, and is held in spring-like contact by spring 15. But when the first selector is in the released or initial position, the torsion head, 13, of the wiper shaft, 14, bears down on the lever and raises 12 from the wheel 5. A detent, 16, is mounted on a shaft, 17, with a spring, 18, arranged to cause the detent 16 to press against the pins, 6, of the wheel 5.

In Fig. 75 the detent is normal, pressing against the pin at its left. This tends to turn the wheel backward, in the direction opposite to the arrow, but is prevented from doing so by the pin just above the detent pressing down on the end of 16. In Fig. 76 the wheel is turned forward almost far enough for detent 16 to fall under the pin. It lacks one notch of so doing. In this position there is a pressure exerted by the detent against the pin tending to force it to the left and rotate the wheel backward. If magnet 7 be released and detent 12 be lifted, detent 16 will push to the left and turn the wheel backward to the position shown in Fig. 75.

By referring to Fig. 71 (Telephony, Dec. 26) it will be seen

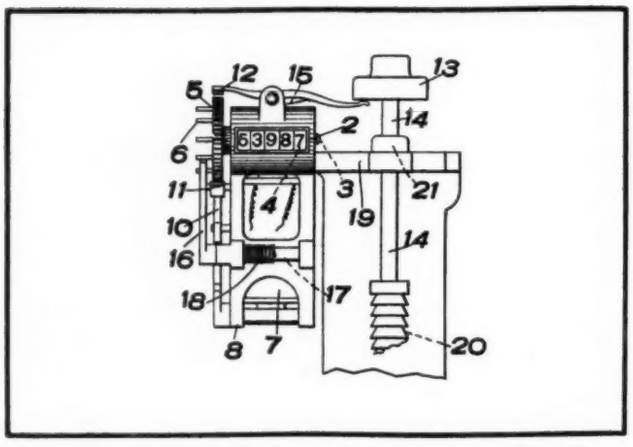


Fig. 74—Front View of Meter, Normal Position, as Installed in Chicago Automatic System.

that the meter magnet is firmly linked with the rotary line, where all impulses over that line will energize it. In the completed call in the 10,000 system, there are five such impulses, one for each digit and one for the release. Hence there are five teeth on wheel 5, Fig. 75, for every pin, 6

*Continued from the issue of Dec. 26, 1908.

This makes 50 teeth in the whole wheel. By referring to the connector, Fig. 73, it will be remembered that when a busy line is selected the busy relay cuts off battery from the rotary line. This makes one rotary impulse fail, leaving only four. Upon this difference the message register is based. In the completed call, that is, if the called

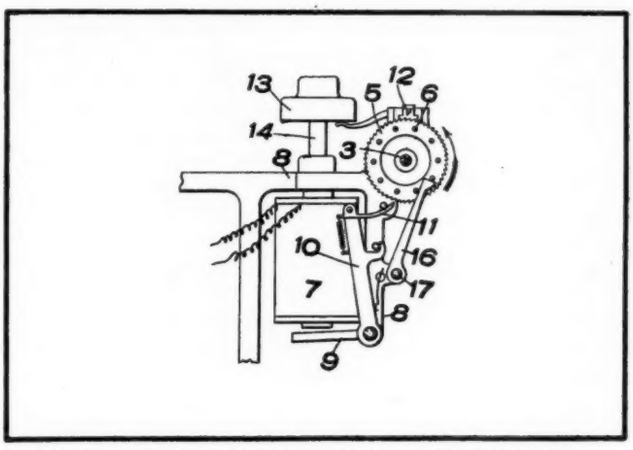


Fig. 75—Side View of Chicago Meter, In Normal Position.

line is not busy, the five rotary impulses move the wheel 5, Fig. 75, five notches, so that detent 16 falls under the passing pin, 6, locking the counter with the one added call. But if the called line is busy, the meter magnet, 7, gets only four impulses in all. During the last of the four, the release impulse, it assumes the position of Fig. 76. Now, when this last impulse ceases, the falling wiper shaft, 14, presses its torsion head, 13, against the lever of detent 12, disengaging it from the teeth of wheel 5. The pressure of detent 16 to the left now rotates the wheel backward to the number previously recorded.

In manual practice it has been customary not to charge for calls if the called station does not answer. In other words, the telephone company undertakes to give the subscriber connection with *somebody* at the desired number. The automatic could not go as far as that at that time, but as shown above no charge was made for calls which found the called line busy .

Fig. 77 shows the relations existing between first selectors and connectors by means of which privacy is secured. At the left are shown in skeleton some parts of a first selector. This first selector is one of a group, and the banks of all of them are multipled together. The wires for the private bank end in the group, merely connecting the banks. The vertical and rotary trunks lead to other groups, where they terminate in second selectors. When any trunk is occupied, the corresponding private wire is grounded by the side-switch lever 3 being in the third position, and the private wiper resting on that private wire contact. Thus any other subscriber in the group will find a ground on the private contact multipled to it and be prevented from interfering. At the same time the off-normal switch grounds the private normal, which comes from the group of connectors at the right. This group has the duty of taking care of all incoming calls to the subscribers whose first selectors are at the left. From the particular first selector which is shown the vertical and rotary normals run to the connectors and are multipled to corresponding points on all the banks in that group. The private normal is also multipled to corresponding contacts in each connector bank. If the line at the left is busy by having made a call, this private normal gets its ground from

the off-normal switch. If it is busy by having been called through a connector, at the right, its ground will come from the private wiper of that connector through which the call came, since the side switch lever 3 will be slipped over to the grounded point.

Fig. 77 also shows how the called subscriber may temporarily

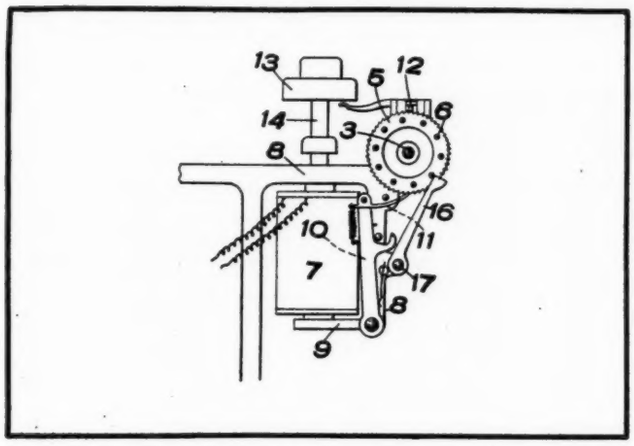


Fig. 76—Side View of Chicago Meter While a Call is Being

leave the calling subscriber and come back again. Suppose someone has called the subscriber whose first selector is there shown. The connector at the right has made the necessary movement, so that connection is secured through side-switch levers 1 and 2 of the first selector. While the calling subscriber at the right waits, the called subscriber at the left can move his dial, operating the first selector as if not connected, and make any call desired. Levers 1 and 2 merely cut off the calling subscriber, leaving him there with battery through the retard coils so that he can release if he gets tired of waiting. When the first selector releases, the levers 1 and 2 will re-connect to the waiting subscriber if he is still there. This feature was considered quite valuable. It also enabled one to get away from a person who became annoying in any manner over the telephone.

The Illinois Tunnel Company desired to have special arrangements made for a plurality of lines to some of its offices for company's business. It was desired that calls to these numbers should be free and also select the first non-busy line. To meet the demand for this class of service a special connector was devised. It is known as the automatic selecting connector, Fig. 78. A third selector built like a second selector could have been used for this purpose were it not for the busy test

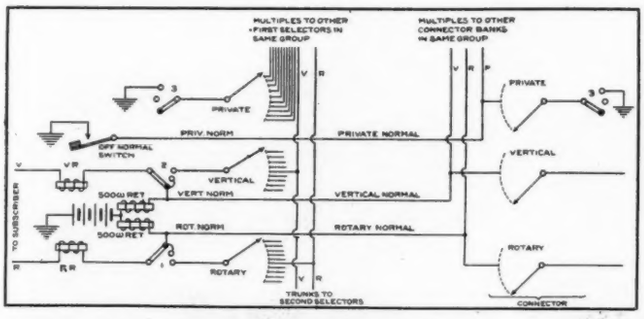


Fig. 77—Relations Between Chicago First Selectors and Connectors Which Insure Privacy.

and ringing. Comparing this special connector with the regular connector, Fig. 73, the following changes will be noted: The rotary magnet has been taken from the middle point of side switch 4, tied permanently to battery, and provided with its own side switch lever, 5. The middle point of this is grounded. The rotary magnet has its own interrupter spring, breaking its own circuit much like a common door bell. Also the finger, *F*, which reached over to the side-switch magnet armature, is replaced, as in a selector. The wire which ran from the middle point of side-switch lever 3 to the busy relay is cut off from the latter and tapped to the side-switch magnet.

To call any of the company's telephones thus equipped required only three digits, so that there were only four rotary impulses in the completed call and no record on the meter. This leaves only one digit to affect the connector. The series of vertical impulses lift the wiper shaft to the desired level. The final impulse on the rotary pulls up the rotary 500 ohm retard, energizing and releasing the side-switch magnet. As the side switch snaps into its second position, lever 5 starts the rotary magnet to vibrating. The first pull of the latter presses the finger, *F*, against the armature of the side-switch magnet, getting the side switch ready to snap into the third position when a non-grounded private point is reached. This stops the rotary magnet as in a selector

(To be continued.)

Instructions for Inspecting Telephones.

Millersburg, Ohio, has an Independent exchange which takes care of its maintenance by keeping the plant in good shape. Mr. M. M. Herron, the general manager of the M. W. & O. Telephone Co., has issued a list of instructions which not only serve the inspector as a perpetual reminder of work to be done on equipment, but recognizes his duties and standing as the representative of the tele-

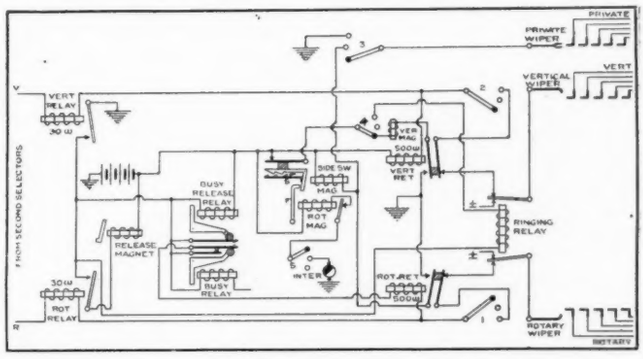


Fig. 78—Automatic Selecting Connector, with Individual Interrupter, Installed at Chicago.

phone company and subscribers' premises. The rules are as follows:

Before you enter a subscriber's residence, wipe your feet. Leave your cigar outside (if you have one), and, if necessary, spread a paper under the telephone to catch the dirt before you begin work.

1—Examine batteries and battery wire.

2—Blow the dirt out of the ringer movement, and wipe the end of the magneto with cheese cloth.

3—See that the gongs are tight and in their proper places.

4—Take the receiver cap off, and see that the diaphram is perfect; if bent do not straighten it, but replace it.

5—Clean the magnets.

6—If the receiver cord is partly worn replace it. If the string on the receiver cord is torn off, replace it with lacing twine or replace the receiver cord.

7—Be sure that the telephone is solid on the wall, and if too high or too low change it to suit the subscriber, without charge.

8—If the carbon block and switch are crowded close together, with coils of wire between them, remove the block and switch, separate them, and cut out the coils so there will be no place to catch dirt. Ask permission of the subscriber to make the changes.

9—See that the block and switch are on solid; double the wire to fill the binding post.

10—Clean the woodwork and the gongs.

11—If the telephone is on a grounded circuit, see if the ground pipe can be driven down further by placing another ground pipe on the end. If so cut slack into the ground wire and solder the joints. Do not in any case leave a coil in the ground wire—leave it straight.

12—Clean the carbon block, carbons and switch.

13—If any of the wires are partly cut off by binding screws and look unsafe, renew them.

14—If the drop is too tight or too loose, adjust it. Solder and tape all joints.

15—Remove all loose tie wires and pieces of wire and limbs on the lead, and trim the line clear. Always ask permission to trim.

16—Leave the drop in safe condition. Make long joints on the lead.

17—Give the subscriber all instruction possible, and see if he has any grievance. If he has, find out what it is and make a report of it.

18—When you inspect or install a new circuit in a cable can, be sure that every contact is properly soldered. Don't wrap the spider wire around the contact and leave it to be soldered some other time, either on the terminal rack in the office or in the can, because the wire will corrode and you can't make a perfect job. Also, the chances are that it will be forgotten and never be soldered, so that this subscriber's line will soon be cutting out. Then he will say that every time he talks the operator pulls the plugs and disconnects him on purpose, and that he will want his telephone taken out if he does not get better service.

19—Before placing tubular fuses in the cable can, wipe the brass ends with dry cloth to remove the insulating corrosions.

20—If you have a circuit dangerously close to a high tension wire and wind or sleet would be likely to cause it to make contact, don't wait until after the storm, but make it absolutely safe immediately.

21—When you inspect or install a desk set, always use an enameled iron battery box.

22—See that the condensers are properly installed, and soldered, in every country telephone.

23—See that the subscriber has a new directory, and destroy the old one, if he still has it.

24—Pull out dangerous looking iron staples for fear of short circuits.

25—Always test with the operator and leave the work in perfect condition.

26—Always bring old batteries back to the warehouse. Report bad cross-arms, poles and condition of the line in writing.

27—In leaving the warehouse, have a stock of batteries, groundpipes, receiver shells, diaphrams, caps, receiver cords, office wire line wires, nails, knobs, glass insulators, soldering furnace, tape, solder, paste, tinfoil, insulating staples, new receivers, tubing and screws for telephones, switches and carbon blocks.

28—Be sure and have your tools and small supplies in a tool bag or box. Do not carry small stuff loose in the buggy, to fall through cracks in the bottom.

29—When you come in from a trip, if your buggy or harness need repairing, or your horse needs shoeing, attend to it immediately and have everything ready. Don't wait until it is time to start out next day, and then begin to get ready, but always have things ready.

30—You can always find time to sort out your supplies and see if you have all of your tools and straighten up the warehouse and know all the time where everything is, and how much you have on hand. Don't wait until you run out of supplies and then report it to the manager, and make several trips without anything to work with.

31—If you are driving in the country, always give your horse good care whether it is owned by the company or a livery. Use your blankets at the right time and feed as regular as possible.

32—When you meet people always give more than half the road. Speak to everybody. If the people you meet are driving slowly and are subscribers of ours, and from the neighborhood to which you are going, ask them if their telephone is all right. If the people you meet are ladies, give them all of the road and drive past them slowly.

33—If you are in an automobile, or riding a motorcycle, make as little fuss with it as possible when meeting a carriage. If necessary run your machine up against the fence or into a barn yard and lead the horse past.

34—Always be a gentleman; it will be good for you and the company you work for.

35—Never say that a subscriber is a crank or a kicker, but thank him for reporting his telephone trouble.

36—Don't tell a subscriber that his telephone is worn out and the company ought to give him a new one; if you do he will never pay you any more rent until he gets one.

37—Do not leave scrap wire or broken knobs, or material of any kind, or any of your tools, on the premises.

38—From the time you enter the premises, treat the whole family courteously. Talk about the weather and the crops. Give them to understand that our company wants them to enjoy their telephone, and have it earn them more money than they pay for it. Insist on their reporting trouble promptly to the right parties, and leave a good impression everywhere.

Mr. Herron seems to have provided against most emergencies. Has any manager a good addition to make to this list? We would all like to see a little discussion of what is necessary for an ideal set of instructions to maintenance men in a moderate-sized exchange.

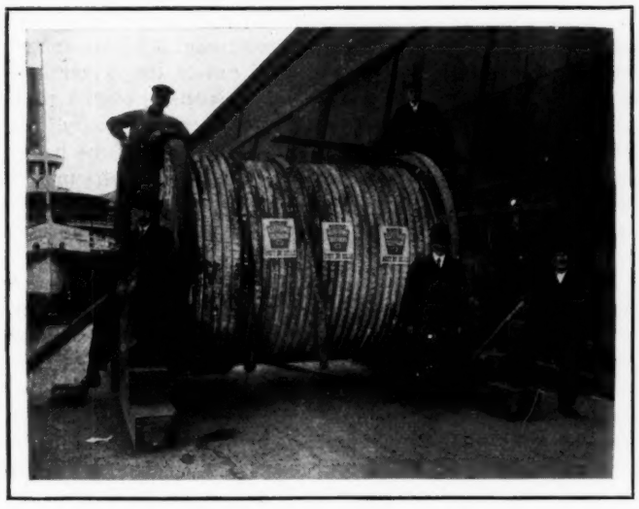
Keystone Company Lays Big Submarine Cable Between Philadelphia and Camden.

On Tuesday, December 1, what is said to be the largest submarine cable of its kind in this country was laid by the Keystone Telephone Company of Philadelphia, under the Delaware river, between Philadelphia and Camden. The company had two cables in service prior to this date, but owing to a largely increased business, additional facilities were required. While the actual work of laying the

Laying 25 Tons of Submarine Cable Between Philadelphia and Camden for the Keystone Telephone Company.

cable consumed but a short time, negotiations with the various authorities controlling the waters of the Delaware, including the United States government, consumed a period of several months.

Great difficulty has been experienced in properly maintaining cables in this locality, on account of the heavy river traffic, and damages caused by dragging anchors. Little trouble is anticipated in the future, however, as the cable



Keystone Telephone Company's Submarine Cable, Length, 200 ft.; Number of Conductors, 206; weight, 26 tons.

was laid with federal as well as municipal authority, and may be used by the government in time of war.

The necessity for this outlay became apparent some time ago. When it is considered that the entire section of Southern New Jersey from Trenton to Cape May and Camden to Atlantic City is served through this system of submarine cables, the importance of using the best possible material subject to careful inspection may be realized.

When the engineers of the telephone company were called upon to design a cable having a maximum number of conductors with minimum capacity, and having an armor of a strength great enough to withstand the severe strains to which it will be subjected to under the waters of a busy harbor, and yet be of sufficient flexibility to permit of being handled on a reel, a problem of no mean importance confronted them.

These conditions have all been complied with, and are incorporated in the following specifications:

Size of conductors, No. 19 B. & S. gage copper; insulation, double wrapped paper; insulation resistance, 3000 megohms per mile; number of conductors, 206; capacity, .10 M. F.; sheath, 5/32-in. lead.

The lead sheath is covered with three layers of jute, outside of which is placed an armor of No. 6 B. W. G. galvanized iron wire, over which is another layer of jute, surrounded by another armor of No. 4 B. W. G. galvanized iron wire. Over this double armor is placed a final double layer of woven hemp, making the total diameter 3½ in.

The length of the cable is 3,200 feet, and its total weight is 26 tons.

It required the combined services of two tug boats and a 100-ton barge to lay the cable. Probably a new record has been established in the time consumed in the actual laying of this cable. It was necessary to choose a day when the weather conditions, tide and current were all favorable, and after once the start was made from the Pennsylvania shore, no stop was made until the landing was reached on the New Jersey side, which was accomplished in precisely twelve minutes.

In consideration of the heavy traffic on the Delaware, and the conditions previously referred to, this is considered remarkable time, and was only made possible by the careful attention to details beforehand by the engineering department.

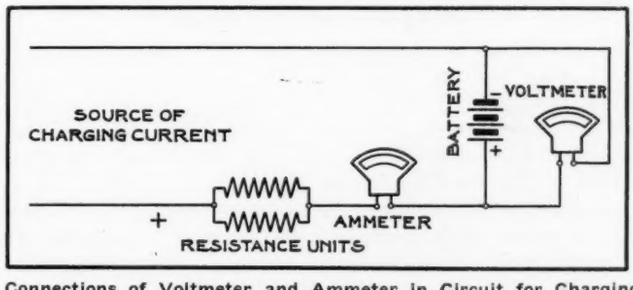
The cable was formally opened for service on Saturday, December 5, and the transmission was found to be up to the high standard maintained by the Keystone company on all its lines.

LETTERS ON PRACTICAL SUBJECTS

Charging Automobile Ignition Batteries.

Noticing in a November issue of TELEPHONY an article on charging automobile batteries, it occurred to me that a little experience of mine in this line might be interesting and useful to telephone exchange managers. In the first place, it may be well to state that storage batteries used for ignition purposes in automobiles are usually 30, 40 or 60 ampere-hour batteries, and in each case, consist of three cells requiring about 8 volts for charging.

I had to charge a 40 ampere-hour battery calling for a charging current of 4 amperes until the battery voltage rose, while charging, to 7.65 volts. I did not want to buy eight lamps and lamp sockets, for resistances, so I consulted a list of enameled resistance units made by a reliable concern. I wanted to charge this 40 ampere-hour cell from a 112-volt direct current lighting circuit; a rather inefficient way, to be sure, but yet it cost much less than a dollar, which is the charge made by a local concern for charging a battery. Moreover, I felt that I could make the battery last longer because I ought to know at least a little more about storage batteries than the ordinary mechanic in the garage. I determined the enameled resistance units necessary by these simple calculations: 112 volts — 7.6 volts = 104.4 volts to be expended in the resistance, $\frac{104.4 \text{ (volts)}}{4 \text{ (amperes)}} = 26.1$ (ohms). The watts to be dissipated in this resistance = 4^2 (amperes) × 26.1 (ohms) = 417.6 (watts). By consulting the manufacturer's circular, I found that I could not get one unit fulfilling all these requirements. Moreover, I would a little rather have two resistance units, to make it possible to cut the charging current down to one-half its normal value, so that by charging longer at a lower rate, any sulphating present would be reduced. I was able to select a 62 ohm unit rated at 400



Connections of Voltmeter and Ammeter in Circuit for Charging Ignition Battery.

watts for continuous duty, and by connecting two 62 ohm resistance in multiple, their joint resistance was about 31 ohms. By connecting this combination in series with the battery to be charged, and the whole across the 112 volt circuit, my ammeter showed 3.6 amperes, and the voltage across the battery was 6.5 volts.

The battery was charged at this rate for 8¾ hours, giving the battery 29.3 ampere-hours, as the current diminished to 3.5 amperes in about one hour after the charging commenced. The voltage had risen to 7.6 volts and did not seem to appreciably increase in the last half-hour while

charging. Then, by disconnecting one resistance unit, the charging was continued for about 3¼ hours longer, the voltage at the end, while charging with 1.7 amperes, being 7.2 volts. To determine if fully charged, both units were again connected in the circuit and the current was now 3.5 amperes and the voltage 7.7 volts, and there was no increase in voltage after 30 minutes, so the battery was considered fully charged. It had taken about 36 ampere-hours. The battery had run down as much from standing a long time without a freshening charge as from usage. The two enameled resistances, including expressage and postage on correspondence, cost me $1.90, but their cost will soon be saved in future charging.

For charging ignition storage batteries in telephone exchanges, where a very much lower direct current is usually obtainable, cheaper coils can be used. For instance, to charge this battery from a 24-volt direct-current circuit would require enameled resistance units that may be determined as follows: $24 - 7.6 = 16.4$ volts. $\frac{16.4}{4} = 4.1$ ohms. Then $(4)^2 \times 4.1 = 65.6$ watts to be dissipated in the resistance units. In the 60 watt list of resistance units at hand no one coil seems suitable, but one 10-ohm coil and one 7-ohm coil will do the work. For their joint resistance $= \frac{10 \times 7}{10 + 7} = 4.1$ ohms, which will allow a charging current of 4 amperes. The watts dissipated in the 10-ohm coil $= \frac{(16.4)^2}{(10)} \times 10 = 26.9$ watts, and the watts dissipated in the 7-ohm coil $= \frac{(16.4)^2}{(7)} \times 7 = 38.4$ watts. These resistance units, which cost 40 cents each, are rated to stand 60 watts continuously, so they will not get very hot and should last indefinitely. Either coil can be used alone, the two in parallel, or both in series, giving four charging rates for a three cell battery, namely, 4, 1.64, 2.34 and .96 amperes. Thus the battery can be charged at normal rate or at any one of three smaller rates. In a similar manner enameled resistance units can be selected for any other charging voltage.

W. S. Henry.

Mechanics and Electricians.

I have often wondered why one man could accomplish more than another in the electrical field and have given much thought and study to the subject. From a psychological point of view, it is the attitude of their minds which determines how much or how little the result of their efforts will affect the advance of telephone science.

A mechanic is accustomed to seeing things, and calculating results on a tangible basis, in units which one can pick up in the hand like quart measures, foot rules, pound weights, etc. But the electrician, in the true and strict sense, is one who is used to seeing things which are intangible, and the units are ohms, amperes, and volts, none of which he can take up in his hands and ascertain whether the right one has been used or not. Now in measuring all circuits one must deal in units which cannot be seen with the eye, but have to be made the basis of calculation, just as if they were apparent. For instance, the practical unit of capacity, 1 M. F., has a certain meaning to the trained electrician and he knows just about what results can be expected of a 1 M. F. condenser under certain condition.

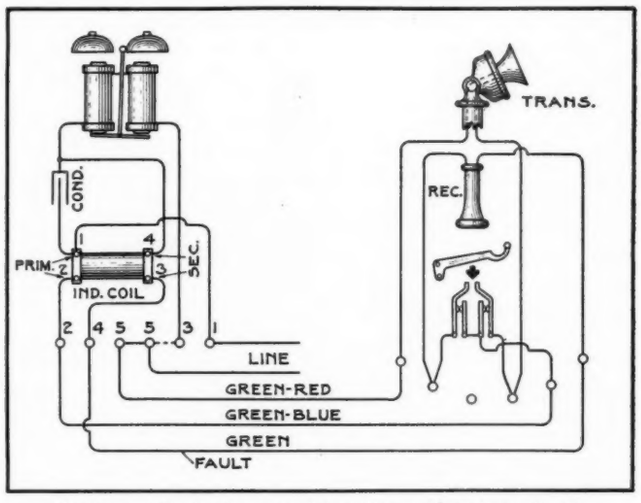
For example take the case of the rural manager who sought to ring a pair of 1,600 ohm bells through a ½ M. F. condenser and found that the bells would not respond when the hand generator was turned slowly, but upon whirling it very rapidly the bells would tinkle just a little. He was at a loss to account for the result, since his mind was not trained to see things in units of capacity, or to think along the lines of the laws and principles governing the flow of electricity and magnetism in circuits. He was a good mechanic, and had soldered all connections, but could not see further than that. An electrician, upon being told the facts as to the capacity and ohmic resistance of the bells at once advised him to put in a 2 M. F. condenser. The manager went out and got the telephone and put in the larger condenser immediately. The electrical scientist had the pleasure of seeing the laws and principles of electricity confirmed in one more case; also, the sunny smile of the happy manager, on seeing the marvelous change in results proved beyond a doubt that a new idea had been revealed to him and one more source of anxiety had been cleared forever from his mind.

Many men engaged in the telephone business at the present time are doing their work from day to day mechanically, with no comprehension of the laws and principles which govern the action of the apparatus put in their charge. Is it, then, right to call a mechanic an electrician inadvertently or should there be some distinction made to designate between the one who sees only things which are material, and the one who sees the intangible units and has the ability to calculate results from them? I say we should give the electrical scientist due credit for superior powers and encourage his achievements in the electrical field by material support.

Minneapolis, Minn. A. M. Severson.

Ink Spilled on Desk Stand Cord Causes Cut-out.

We had a peculiar case of trouble at a desk instrument. It acted as a loose connection in the receiver circuit. We traced the fault to the strand of the three conductor cord connecting the secondary of the induction coil to the receiver. There had been some ink spilled on the cord at some time, and it had soaked through the braided covering.



Wiring of Desk Stand and Location of Fault in Cord.

The acid in the ink corroded the wire, so that the injured section acted as an insulator. When the cord was pulled tight the two parts made contact, and when the cord was loose the conductor was open. We could not clear it by scraping, as the fine wire strand was corroded quite through and the bad section had to be cut out and the conductor spliced together.

Harry L. Weeks, Supt. Suffolk Co. Tel. Co.
Patchogue, N. Y.

Practical Questions and Answers

Noise From Telegraph Wires.

I have twelve miles of bridged grounded telephone line; also four miles telegraph, on parallel pins. Both lines are grounded at stations 1 and 2.

Grounds at station one are nearly touching, at station two about 75 feet apart. We use double rubber covered wire from wires to instruments. The pulsation of the telegraph battery causes so much noise in the receiver, when working, that it affects the working of the telephone line.

The cause of your difficulty is induction, partly electrostatic and partly electromagnetic. The pulsations of current in the telegraph wire induce charges of electricity on the telephone wire, which flow to ground through the instruments. The fact that the two grounds are close together has no influence, provided both are good grounds, in permanently wet earth and there is no wire or other resistance common to both. This may be obviated in one of two ways.

First. Provided the two wires in the four-mile section

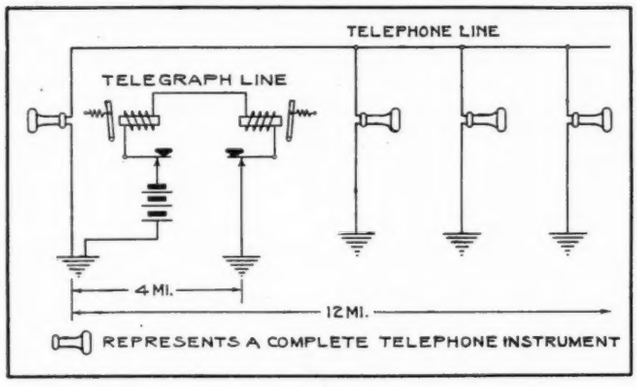


Fig. 1.

between the first and second stations are of the same size and character, they may be used for a metallic telephone circuit and simplexed for telegraph. This requires two repeating coils as shown in Fig. 2.

The second scheme, Fig. 3, contemplates the stringing of a third wire in order to make the talking circuit metallic throughout the four-mile section. This makes it possible to transpose the telephone circuit and neutralize the telegraph induction. Transposition is not possible between two single wire circuits. This scheme requires one repeating coil at station No. 2 where the metallic telephone circuit changes to grounded circuit.

The second telephone wire must be of the same size and character as the present one.

If the two wires already strung are not of the same size

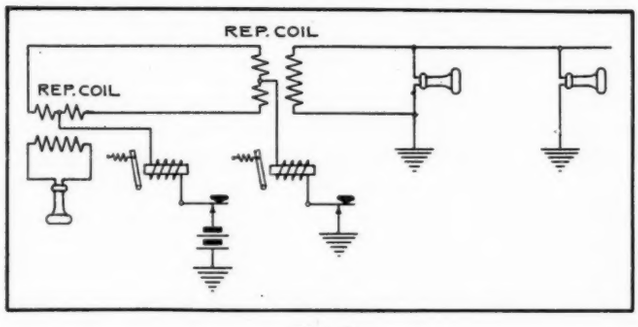


Fig. 2

and character the first proposed scheme is of no use. The unbalanced condiion of the simplexed circuit will still permit cross-fire or induction from the telegraph circuit. Otherwise scheme No. 1 is preferable on account of its cheapness and simplicity.

General Use and Efficiency of Chemical Rectifiers.

In reference to chemical rectifiers for charging storage batteries, can you give me any information in general regarding their make-up, efficiency, cost for maintenance, purchase price, etc.? If they are of value, why are they not made use of for charging medium sized storage cells in telephone exchanges located in small towns, where the only source of current supply is from the alternating lighting system?

In general, a chemical or electrolytic rectifying cell is made of a plate of aluminum and one of lead immersed in some solution. This solution varies with different makes, and most makers keep the nature of it a trade secret, claiming to have a compound which is better than a simple salt. Phosphoric acid and also neutral ammonium phosphate solutions have been used by experimenters who have published the results of their work.

The efficiency is rather low. A well known manufacturer

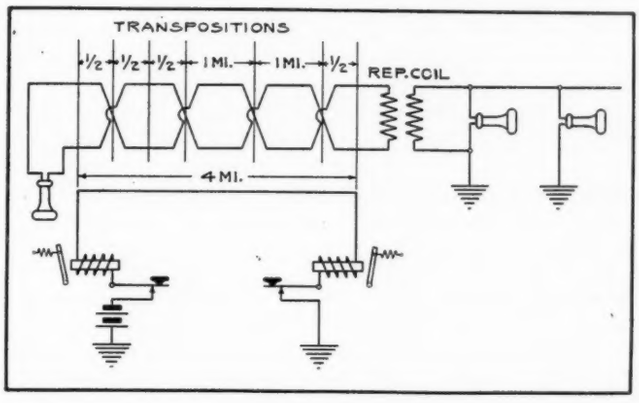


Fig. 3.

states that in his work he finds a loss of from ten to fifteen volts in the rectifier, and that not more than 65 per cent of the remaining energy is serviceable.

The aluminum electrode wears out in time, as does also the electrolyte. The cost of renewing both is estimated at about 10 to 12 cents per 1,000 ampere-hours of service. The cost of apparatus varies with the size. An outfit, including auxiliary apparatus for controlling current with a maximum capacity of two amperes lists at $12.00, one for ten amperes, $54.00, and for 30 amperes $110.00.

Until very recently the electrolytic rectifier was hardly beyond the experimental stage. This accounts for the limited use to which it has yet been put. Also, the low efficiency scares many people from installing it. It will not pay for large currents, but for small currents it will doubtless pay. The cost of getting current rectified is in three parts, viz.: interest on money invested in the outfit; cost of renewing parts and general up-keep; cost of the current.

TO WIRE CHIEFS AND MAINTENANCE MEN.

Clearing of troubles which occur in your exchange, inside or outside, may be made the subject of short, practical letters which will interest other telephone men These TELEPHONY *will gladly publish, if illustrated by diagrams or photographs. Simply write a description of the nature of the trouble, tests and location, cause found, and method of repair. Payment will be made for all letters published.*

In small plants the last may be small, while the first may be large, as in the case of motor-generator sets. All three must be added together in every proposed case to determine which method is cheapest.

Telephone Law

Conducted by A. H. McMillan

Responsibility of Unincorporated Company for Damages.

We have a farmers' telephone company covering about 30 miles of country, with about 100 telephones on it. What is our responsibility as an unincorporated company for damages caused by wires getting down and persons or wagons being damaged by them? What would be the advantage of being incorporated in such a case, and how far would our responsibility go in each case.

There are several farmer lines around here, and we would like your opinion on these questions for their benefit.

Your responsibility as a company for damages caused by wires falling down and persons or wagons being damaged thereby is the same as it would be in case you were incorporated. In other words, if the accident happens through default of your company, your company is responsible. The advantage of being incorporated in such a case would be that the person injured could, in case he obtained a judgment against the company, levy his execution only on the property of the company. Being unincorporated, he could levy his execution not only upon the property of the company, but upon the individual property of each member of the company until his execution was fully satisfied.

With What Company Must Subscriber to Rural Line Liv-

In this letter I am asking a number of questions for your legal opinions.

Is the city ordinance that I enclose for your inspection, a franchise?

I enclose a contract which both parties have signed willingly and in good faith. Is this contract binding on both parties until its expiration? Or could either terminate it legally at any time.

A farmer owning a share in a rural telephone line and paying $3 per year moves to town, where the telephone company has a rate of $6 per year for such connections. The rural line extended into the city limits, so that by running a wire across the street he could connect with his own wire. The telephone company notified him that he would have to make the proper arrangements with them if he desired a telephone in that town. Regardless of everything he strings the wire and connects with his line and refuses to pay more than the $3 per year.

The line in which he has an interest is in every sense a mere partnership company, not incorporated.

The city had previous to this time passed the above ordinance.

If in case the directors of this rural line should tell the party that he must pay the $6 per year, and he should refuse to do so, and the telephone company refuses him service, who can legally handle the case?

Can his line or telephone be legally cut from over the street, or off the rural line?

The city ordinance you enclose is a franchise. This being our opinion, it is not necessary for us to answer your question as to what is a franchise. The city ordinance in question gives you the right to operate a telephone system in the city where you are located and provides that you shall receive for the rental of telephone instruments not to exceed $1.50 per month for business telephones and $1 per month for residence telephones. Rural lines having eight or more instruments connected are to receive service for not to exceed 25c for each patron so connected.

The contract you enclose is binding on both parties until its expiration. If either party to it terminated it before the time of expiration provided therein, such party would be liable to the other in damages. Among other clauses in the contract, is one that prevents the other contracting party from building any telephone line or connecting with any telephone line which operates in either direct or indirect competition with your line, without first obtaining your written consent.

The company to legally handle the case of an obdurate farmer, who insists on connecting with his own rural line, although he lives in the city, is the rural company. The city telephone company has no contract relations with him, and is in no position to force him to any action. The question of whether the directors of his own line can legally sever his connection with it, depends upon the internal regulations of their company. If it is provided that all subscribers living in the country shall pay $3 per year, or that the company shall do business only in the country, or any similar provision, the directors can refuse him service for $3 a year.

So far as the city company is concerned in this case, all it can do is to make a claim against the rural company for damages under the section of the contract above referred to that prohibits the country company from competing with the city company's line. This is on the assumption that the contract you enclose is one that exists between the city company and the country company.

City in Michigan Cannot Cut Down Poles.

By a decision of the Circuit Court of Ingham County at Ithaca, Michigan, the injunction obtained by the Union Telephone Company against the Ithaca corporation is upheld, and the city cannot tear down any more poles belonging to the company, which stand in the streets.

The controversy began with an ordinance passed by the city requiring all telephone poles and wires to be taken off Center street, the main thoroughfare. The company did not comply with the ordinance, and Sunday, September 6, Mayor Harrington marshalled a force of men and worked all day, tearing down all but three of the poles in Center street. At midnight, of that day, the city force was served with an injunction restraining them from further interferring with the poles.

Personal Injury Caused by Negligent Use of a Metal Tape Measure.

Dennis Murphy sued the Hudson River Telephone Company for injuries arising in a curious manner. The superintendent of the company gave him a tape measure constructed of copper wire to use in measuring the distance between its wires and high wires belonging to other companies where they crossed each other. The tape appeared to be of ordinary linen, but inside it were a number of small copper wires extending through its entire length. Murphy was injured by the electric current coming in contact with the metal tape. Upon his suing the company he was given a judgment which was affirmed by the Supreme Court of New York on the ground that the company was negligent in furnishing the tape, although it was brought into contact with the electric wire by the act of a fellow servant. Murphy vs. Hudson River Telephone Company, 112 N. Y. S., 149.

Damage for Cutting Trees.

Where a telephone company destroys twelve locust trees each about a foot in diameter by cutting them off to within ten or twelve feet of the ground, the damage being estimated by a witness as high as $1,000 to $2,000, a verdict of $500 will not be disturbed as excessive. So the Court of Appeals of Kentucky decided in an action brought by Mrs. A. M. Shirley against the Cumberland Telephone and Telegraph Company for $3,000. On the first trial she was awarded damages in the sum of $1,000. That verdict was set aside and the company given a new trial, in which the plaintiff recovered $500 damages. Cumberland Telephone and Telegraph Company vs. Shirley, 112 S. W., 1109.

Telephone News

Nebraska Convention at Lincoln, Jan. 13, 14, and 15, 1909.

Announcement has just been made by the Nebraska Independent Telephone Association that the annual convention will be held at Lincoln, on Wednesday, Thursday and Friday, January 13, 14 and 15, at the Lindell Hotel.

The first session will be called to order at 3 p. m., Wednesday, January 13. The program has some extremely strong features, and matters of sufficient importance to interest every Independent telephone man in the state will come up for discussion.

Keystone Earnings for Five Months.

The recently published statement of the Keystone Telephone Company, Philadelphia, for five months ended November 30, shows that the earnings have averaged for this period in 1908 $87,866 gross and $44,385 net per month, says the *Wall Street Journal.* In gross earnings the business is running level with last year, but some reduction in expenses has made net earnings a little better this year. The following indicates the amount of gain in gross and net business in this period in the last four years:

	1908	1907	1906	1905
Gross earnings	$439,383	$437,270	$398,044	$331,470
Average per month	87,876	87,456	79,609	66,294
Net earnings	221,928	295,469	176,574	154,332
Average per month	44,385	41,094	35,315	30,866

The earnings in 1905 are at a date preceding the acquisition of the Eastern Telephone, and since then the gross business has been considerably extended. As by so doing $107,000 more gross business in the fifteen months of 1908 than in the same period of 1905 the profits were increased $67,000, the taking on of the new business has been at a gratifying increment to the net earning power. The present earnings are at a rate of $1,000,000 gross and $540,000 net per annum. This would represent some gain over the amount of net earnings of the fiscal year ended June 30, 1908. If the company continues its policy inaugurated two years ago of charging up a maintenance renewal fund of $4 per telephone per annum, the present rate of earnings would produce a suprlus earnings over fixed charges for a whole year equal to about 5½ per cent on the preferred stock. There are now stated to be over 29,000 telephones installed.

Injunction to Prevent Interference from High Tension Current.

An interesting and important question has been raised by the filing of three injunction suits in the Porter Circuit Court at Valparaiso, Ind., in which the Western Union and the Postal Telegraph companies and the Lake Shore & Michigan Southern Railroad Company complain of the Lake Shore & South Bend Electric Railway system and ask for a perpetual restraining order against the electric company from the use of its present high voltage system.

The complaining corporations allege that their telegraph and telephone wires parallel the electric railway system, and that the latter's high tension current used to operate cars is so powerful that by induction it renders wires of the telegraph companies useless at times, and greatly cripples the service between Chicago and New York. It is pointed out that the single phase line of the traction company carries 6,600 volts. It is charged in the petitions that not only is the telegraph system paralyzed, but the lives of the operators are endangered, property exposed to destruction by fire and the carrying of U. S. mail and government messages interfered with.

The filing of these suits has occasioned considerable comment and while attorneys acknowledge the question to be a new one, they are inclined to the belief that there is no relief since there is no property right in a ground circuit. Mr. F. J. L. Meyer, general counsel for the defendent traction company, says he does not anticipate any trouble in putting up a successful defense. He said, "The alleged interference said to be caused by the high tension wires of our company has been mentioned often before, but this is the first attempt at action through the courts to restrain such use. It is significant that the plaintiffs asked for a permanent injunction rather than a temporary restraining order. In the latter event should the order be granted and judgment rendered against them, they would be liable for damages."

A suit is now pending in the Adams County Circuit Court at Decatur, by the Decatur Telephone Company against the Ft. Wayne, Decatur & Springfield Traction Company for damages growing out of similar conditions which necessitated the removal of the telephone wires a greater distance from the trolley wires. Only the cost of removing the poles and wires is demanded. The Decatur Telephone Company was advised against bringing an action for a restraining order against the traction company on the ground that it is a well known fact that the traction companies of Indiana by the use of a metallic circuit are operating successfully telephone lines strung on the same poles and along side of the high tension trolley wires and this would, without doubt, probably defeat any action for a restraining order. The company, however, can probably prove by experts that this line of testimony is irrelevant.

Annual Meeting of the Second District Missouri Independent Telephone Association.

Preparations are being made for the annual meeting of the Second District Missouri Independent Telephone Association to be held at Pattonsburg, January 7th, 1908. The afternoon will be given over to the discussion of various telephone problems in the afternoon, and an interesting program is promised.

A banquet will be given in the evening by the Commercial Club and the Home Telephone Company, of Pattonsburg, who are sure to exert exery effort to make the evening a pleasant one for all who attend.

Senator Page, of New York, Criticizes Bell Telephone Financing.

A recent issue of the Financial Bulletin, Philadelphia, contains the following:

"Senator Alfred R. Page, who introduced the Public Service Commissions law in the New York State Legislature and this year tried to have the law amended to bring telegraph and telephone companies under the jurisdiction of the commissions, has issued the following statement:

"This week's bond issue of the American Telegraph & Telephone Company, more commonly designated the Telephone Trust, furnishes an example of what would be prevented by proper state regulation of these companies. It is announced that $50,000,000 additional 4 per cent bonds have been sold to a syndicate composed of J. P. Morgan & Co., Kuhn, Loeb & Co., Kidder, Peabody & Co. and Baring Bros. & Co. It is further stated that the syndicate got the bonds at 91 or 3½ points lower than the price of the $100,000,000 bonds floated a year ago. Experience with these syndicate transactions indicates that if the bonds are being underwritten at 91, the bankers may be getting them at still less, and at any rate, there is reason to believe that the company is paying 10 or 12 per cent. for money.

"Of course, the public must pay for this financing. The public has a right to know whether the $50,000,000 is needed for improvements and proper extensions, or only for the

demands of frenzied finance. The state should exercise its authority to examine all these proposed bond issues, and no public service corporation should be permitted to issue stock or bonds without the approval of the Public Service Commission. If the Legislature had passed at the last session the bill putting telegraph and telephone companies under State regulation, this $50,000,000 bond issue would have been subjected to proper scrutiny in the public interest. Because that bill was not passed, any disregard of public interest in connection with such a bond issue can be brought to light only by what Governor Hughes has aptly called a 'post-mortem' examination."

Indianapolis Telephone Case Argued and Taken Under Advisement.

Arguments have at last been heard on the demurrer to the petition for the cancellation of the lease made to the Indianapolis Telephone Company by the New Telephone Company, and providing for the appointment of a receiver for the telephone property and an order restraining the companies from entering into the benefits of a new franchise about to be awarded by the city to the Indianapolis Telephone Company. The petition was filed by Prosecutor Hooton, ostensibly in the name of the people, but is generally understood to have been instigated by the Central Union Telephone Company and encouraged by a local newspaper antagonistic to the present city government. The question raised on demurrer is an important one, and the several courts through which it has passed have permitted a wide latitude in argument. However, the concluding argument, heard by Judge W. H. Parr, of the Lebanon Circuit Court, was practically narrowed down to the interpretation of Sec. 8 of the Indiana Revised Statue of 1881, relating to telephone companies. The section provides that: "Any telephone companies organized under this act shall have the power to lease or attach to other telephone lines or exchanges by lease or purchase;" a later revision, instead of "companies" uses the word "company."

The principal arguments for the state were made by O. B. Jamison, presumably in the employ of the Central Union Telephone Company, and J. W. Holtzman, who was mayor of Indianapolis at the time the franchise was granted, and signed by him—an instrument which he now seeks to declare void, because alleged to be in controvention of the statute. Mr. Jamison contended that the Indianapolis and the New Telephone companies had entered into a conspiracy to defraud the people, water the stock and issue securities far in excess of the value of the property involved in the lease. Mr. Holtzman devoted considerable time to an attempt to convince the court how, in his judgment, Sec. 8 of the telephone law should be construed. He insisted that the latest revision provided that a company may lease a part of its system or lines, but cannot lawfully lease the whole system.

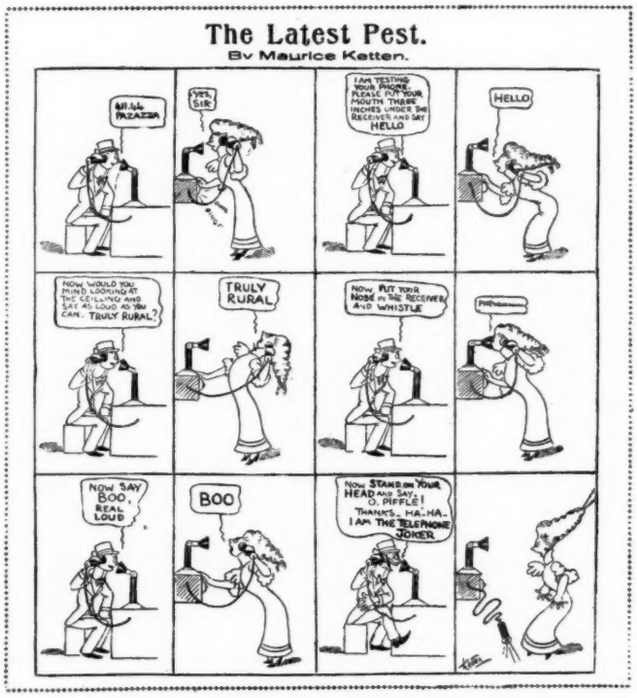
Ferdinand Winter, principal attorney for the companies, forcibly insisted that the New and Indianapolis Telephone companies had not exercised any improper use of power, and had not wilfully or knowingly exceeded their franchise rights in the leasing by the New Telephone Company of its plant to the Indianapolis Telephone Company; that such right was expressly given telephone companies. He insisted that the result of the lease, which was a means of consolidation, was not against public policy. He said that to cancel the charters of the two companies and place the property in the hands of a receiver would wreck the enterprise, and be a means to the end of wiping out telephone competition in the city and establishing a monopoly by the Bell company, which has a liberal and unlimited franchise. This probable consumption, he insisted, would be against public welfare and contrary to public policy.

The closing argument for the telephone companies was made by Hon. S. M. Ralston, who clearly and convincingly summed up the position and points made by the defense, and refreshed the court's mind on the more important issues discussed and cited numerous cases in direct opposition to the contention of the state. In construing Sec. 8 of the statute, on which the decision will be based, he contended that the section in question does not mean that a whole telephone system can not be leased. He said the New Telephone Company is still responsible to the city of Indianapolis for its fulfillment of the franchise, and that the leasing of its lines did not release the company from its obligation. Mr. Ralston cited the recent Evansville Telephone case in which Judge Anderson of the Federal Court held, under Sec. 8 in question, one company could not purchase another, but that he did not rule that a company could not lease its entire system.

Judge Parr said he would take the matter under advisement and endeavor to hand down his ruling the first week in January.

Buffalo Supervisor's Refuse to Pay for Bell Service.

Sheriff Smith, at Buffalo, N. Y., is endeavoring to convince the County Board of Supervisors that they should approve vouchers for rental of Bell telephones. These were installed against the order of the supervisors, who sanction only the Independent service for County offices.



A Chicago Cartoonist's Idea of a Telephone Joke.

Iowa Telephone Men Confer with Governor About Regulation.

The Des Moines, Ia., *Register* published, on Dec. 16, the following:

President Shoemaker, of the Iowa Independent Telephone Association; Clyde Brenton; J. N. Bellamy, of Knoxville; Manager Thill, of the local telephone toll clearing house; Charles G. Cockerill, of Omaha and other Independent telephone men, were in conference with the governor yesterday. They are anxious to have the legislature pass an anti-discrimination law which will prevent telephone companies from selling service

in one locality cheaper than in others situated similarly to destroy competition. They also oppose the suggestion that all telephone companies should connect their lines. They have no objection to the public utilities commission plan which is being advanced steadily.

Good Meeting in First Missouri District.

The annual meeting of the First District Missouri Independent Telephone Association, held at Cameron, Mo., on December 9, proved to be the most successful meeting ever held in the district. A large number of telephone men were present, and the discussions held after each paper were entered into with much spirit.

The morning session was called to order at 10:30 a. m. by President H. C. Todd, and reports of various officers and committees were read, after which the meeting was adjourned until 1:30 p. m., when the following papers were read:

"Progress and Benefits of District Meetings in Missouri," W. R. Barkdull, Windsor; "Business Methods in an Exchange," Pascal Parker, Liberty; "Service and its Secrets," by H. E. Scovern, St. Joseph; "Intercommunication or Physical Connection for Toll Lines," open for discussion; "On What Basis Can Connections be Made with Mutual Companies," L. H. Roberts, Plattsburg; "Expense of Operating Farm Lines," S. D. Thompson, Cameron; "Protection and Protectors," M. R. Martin, Oregon; "Preservative Methods against Deterioration," H. C. Todd, of Maryville; "Economy in Collecting and Accounting," open for discussion.

The officers elected for the ensuing year were: S. D. Thompson, Cameron, president; C. R. Bauman, Savannah, vice-president; M. R. Martin, Oregon, treasurer. Members of the executive committee are H. E. Scovern, of St. Joseph, and H. C. Todd, of Maryville.

C. H. Judson, Engineer of Independent Company, Talks on Telephone Growth in Seattle.

C. H. Judson, chief engineer of the Independent Telephone Company, was the guest of honor at the last meeting of Seattle's Saturday Luncheon Club, composed of business men who meet once a week to discuss the leading topics of the day.

Mr. Judson gave a comprehensive history of the Independent Telephone Company in Seattle.

He stated that in 1901 he was called upon to plan a system for Seattle with an estimated population of 60,000 and a possible subscription of 4,000 to 4,500 telephones. At the end of eight years Seattle had a population of more than 250,000 and the telephone company had more than 16,500 subscribers.

Corn Belt Company Gives Good-Will Offering to Employees.

A unique idea, put in force by J. H. Shoemaker, general manager of the Corn Belt Telephone Company, Waterloo, Iowa, was the sending of a letter of greeting to each of the Corn Belt Telephone Company "workers." Not only did this letter express the good wishes of the company, and its gratification with the co-operation of all the members of its staff, which has been such a valuable factor in carrying it to the front, but there was enclosed for each person whose name appeared on the pay roll, a valuable Christmas present from the company, which was of a character especially appropriate to the occasion.

The Only Pole in Five Miles.

A friend in the South has sent us the accompanying picture of a support for telephone wire which is actually holding up a piece of a line in Texas, with the following note:

"Knowing your propensity for collecting photographs, I am enclosing herewith one which was recently sent to me. You will note from the writing on the back of the picture that it was taken at Sterling, Texas, and shows a typical Western Texas fence telephone line, made of barbed wire. This is the only pole in a five-mile fence line, and was set up to raise the wire at a lane crossing.

"Last year a Southern manufacturer furnished some five-

Portrait of the Only Pole in a Five Mile Line.

bar telephones to be used on a very long line of barbed wire strung on mesquite poles, so such construction is not absolutely unique, although, to telephone engineers, a performance of this kind seems ridiculous. But it is the lines built like this which, in the first place, have done so much in the rural communities. Incidentally it is equipment ready to work under all conditions, with this sort of rough and ready construction, which the Independent manufacturers have been compelled to furnish, and this has been the means of strengthening their product to its present position of leadership."

Toledo Druggists Abolish Free Telephone Service.

Druggists in Toledo, Ohio, tired of the profitless bother of furnishing free telephone service to all comers, are reported to have unanimously agreed to the installation of pay stations. Hereafter, instead of counting the telephone as an item of expense they will receive a commission on calls. One druggist, referring to the extent of the abuse of the privileges he had been extending, said:

"It was about time some action was taken. We have had on an average of 400 telephone calls from the two public telephones in this store. We counted them here the other day, and there were more than 200 on the Bell line, and as many if not more on the Home. Last night between 7 and 8, 56 people used the two public telephones and at least 80 per cent of them were girls. We usually have them lined up here 8 and 10 deep waiting their turn."

Michigan Central Starts Telephone Train Dispatching on Saginaw Division.

Following out its plan to eventually displace the use of the telegraph by the telephone in train dispatching, the Michigan Central Railroad will, in January, 1909, install telephones in all the offices of the Saginaw division. Telephones have already supplanted the telegraph for train dispatching, transmitting orders, dispatches, etc., pertaining to the operation of the road, on nearly all the other divisions of the M. C., and on part of the main line from Detroit to

Jackson. It is reported that the plan of telephoning orders has been found to be very successful, the chances for mistakes being less and the service much more speedy than by the use of the telegraph. In dispatching trains over the M. C. by telephone, each word is first spoken, and then spelled out, letter by letter. In this way mistakes are avoided and quicker service is given.

Nebraska District Association Meeting.

The last meeting of the Third District of the Nebraska Independent Telephone Association, recently held at Columbus, showed the progress which has been made in toll work during the last few months. The following members were present:

C. J. Garlow, president state association; R. E. Mattison, secretary state association; W. J. Stadelman, president third district association; Wallace Wilson, manager Fremont Telephone Company; F. D. Lowry, salesman Western Electrical Co., Omaha; Peter Schmidst, director, Monroe Independent Telephone Co.; O. E. Sunderman, president Madison County Telephone Co., Madison; C. C. Deering, manager Independent Long Distance Telephone Co., Omaha; A. Bratt, president Monroe Independent Telephone Co., Genoa; L. H. Schumedeke, vice-president Monroe Independent Telephone Co., Newman Grove; H. E. Nelson, wire chief, Monroe Independent Telephone Co., Genoa; F. E. Webb, Madison County Telephone Co., Madison; Wm. Busteed, Madison; T. J. Cottingham, Columbus Independent Telephone Co.; R. C. Field, manager Korsmeyer Electric Co., Lincoln; F. J. Bartlett, salesman Korsmeyer Electric Co., Lincoln; J. R. Powers, salesman L. H. Ericsson Telephone Manufacturing Co., Buffalo, N. Y.; A. Anderson, treasurer Platte County Independent Telephone Co.

An address was made by President W. J. Stadelman, and one by C. J. Garlow of the state association along the lines of making and improving long distance connections, and putting in force better business methods and better business generally.

President Stadelman, in his address said:

"The main object of district associations is the getting together of the operators of a certain prescribed district, so that they may discuss matters pertaining to the telephone situation as they find it surrounding their own property.

"There are two very important things to be considered in the telephone field.

"First; the establishing of good long distance connections.

"Second; the up-building of our state association. One is necessary for the betterment of service, and the satisfaction of our subscribers, and the other for self-protection. Relative to long distance connections there have never been prospects for future growth as bright as for the coming year. This same condition seemed to exist each year that I have been interested in the telephone business, but never before in the past ten years has there been so much actual work performed, especial as has been accomplished in the past twelve months, and with this condition existing it must bring forth good results the coming year.

"The State of Nebraska is fortunate in having a long distance company organized which is amply able and willing to develop this territory with construction which is second to none, and which is able to furnish a service that has never before been enjoyed.

"In Norfolk we have connections which reach the following counties; Madison, Wayne, Cedar, Dixon, Dakota and Thurston including Iowa east from Sioux City. We have three circuits to Waterbury, which in turn has five to Sioux City, and after December 1st will ring Sioux City direct. We now do a commercial business to Council Bluffs, Omaha, South Omaha, Lincoln and the South Platte territory. This same service will be materially improved as soon as the line is completed from Waterbury to Arlington direct to Omaha via Oakdale and Pender, taking in the counties of Cumings, Burt, Dodge, Washington and Douglas. This will also establish a rapid satisfactory service to Fremont, Wahoo and Lincoln, which will put us in touch with the Western Telephone Company's long distance lines that run west through the central part of the state taking in the territory surrouding Seward, York, Grand Island, Hastings, Kearney and Ravenna. We expect to have this line cut in by December 15th.

"There is still one connection which we are very desirous of establishing, and from present indications it will be accomplished the first thing in the spring, and that is between Madison and Columbus. With this latter line completed the third district should never turn down a call, as the main distributing points will have many circuits and many directions to handle the business. Your operators should be advised fully about any newly established connections.

"Systematic advertising of our long distance connections is very essential as the public has been led to believe that the Independent companies are only local institutions.

"If you have any weak places in your territory, which are giving away free service, see that your lines are rebuilt, and that the free service leak is stopped. The general public who use, and pay for long distance service will not patronize a company who has established free service and who cater to those who are not willing to pay a fair rate for the service which has cost money and time to procure.

"The public are perfectly willing to pay but they demand a rapid and efficient service. The sooner we learn this the better it will be for all concerned."

President Stadelman also emphasized the value of co-operation in State and District associations, as a means of building up long distance business.

R. E. Mattison, secretary of the State Association and manager of the State Traffic Association, gave a detailed report of the work of both associations. C. C. Deering, manager of the Independent Long Distance Telephone Company, Omaha, gave a report of work completed up to date, and also outlined the new work planned. Mr. A. Bratt of the Monroe Telephone Company, Genoa, explained the workings of the Monroe system.

O. E. Sunderman, president of the Independent Telephone Company, of Madison, gave an interesting talk denouncing free service, stating that the many paid for the privilege of the few. Wallace Wilson, manager at Fremont, led a discussion on territorial agreements.

A question box was arranged to be opened at the evening session. The meeting then adjourned to accept an invitation to eat supper with the Platte County Telephone Company's officers.

At the evening session the question box was opened, and contained some interesting questions including: "Does it pay to operate an automatic plant with 500 subscribers?" "What is the best way to build long distance lines?" "What is the best method to pursue to advertise your long distance business," and others that were fully discussed.

The meeting adjourned with the understanding that the next meeting is to be called at Norfolk.

Indiana Sentiment for Public Service Commission, Despite Opposition of Telephone and Traction Men.

The Indiana Manufacturers and Shippers' Association intends to make a vigorous fight for the establishment of a public utilities commission, to take the place of the railroad commission, with powers extended to include telephone, telegraph and water companies. It is apparent, however, that the scheme will be fought by heads of many public service corporations, and certainly by the telephone and traction companies.

In the appointment of a legislative committee by the association at its recent meeting in Indianapolis, the telephone men

scored a point in demanding representation on that committee, which was instructed to draft a public service bill and urge its passage by the incoming legislature. Charles S. Norton, of the Indianapolis Telephone Company, and president of the Indiana Independent Telephone Association; A. J. Payton, of the Rockville Telephone Company, and secretary of the Indiana Association, and T. P. Sylvan, contract manager of the Central Union Telephone Company, were made members of that committee, all of whom are strongly opposed to such a measure. With the aid of other public service men they propose to put up a vigorous opposition to any bill calculated to exercise any arbitrary jurisdiction or supervision over telephone companies by any public utilities commission appointed by the governor. Telephone men in Indiana are watching this carefully.

Telephone Patents

Conducted by Max W. Zabel

PRIVATE BRANCH EXCHANGE TELEPHONE SYSTEM.

F. Arens, Cincinnati, Ohio, patent 906,602, Dec. 15, 1908.

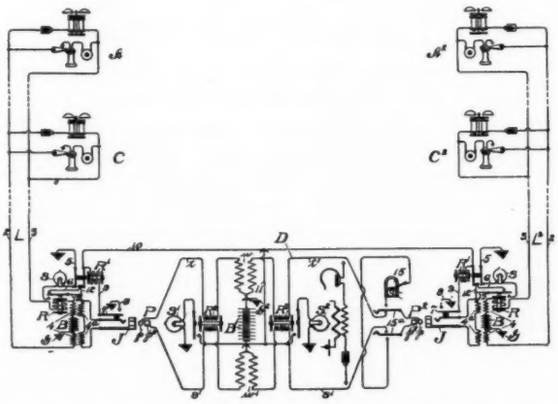
A private branch telephone system is outlined in this patent, in which it is desired to have the total supervision not only by the private branch operator, but also by the operator at the main exchange.

The invention consists in general of the lines entering the private branch exchange, the cord pairs, the answering and calling jacks and supervisory signals. A shunt circuit connects the main lines, and has two spring contacts. The first of these spring contacts is normally open, and the second normally closed, relays being used for operating them. The circuit through the first relay is closed when the answering plug is inserted, and the circuit through the second relay is closed when the supervisory signal operates. A supplemental circuit connects the second relay with the answering plug, and this circuit is, of course, normally open. A spring contact in this normally open circuit is closed by the operation of the second relay at the same time the supervisory signal operates.

TELEPHONE SYSTEM.

William W. Dean, Chicago, Ill., patent 907,224, Dec. 22, 1908, filed Aug. 23, 1901.

This invention relates to supervisory systems for common battery telephone exchanges, and is designed to permit of a plurality of subscribers being connected to the same line, and yet properly actuating the clearing out signal. As shown in the illustration, the apparatus necessary to accomplish this result comprises the line relay R, together with the cut-off relay R',

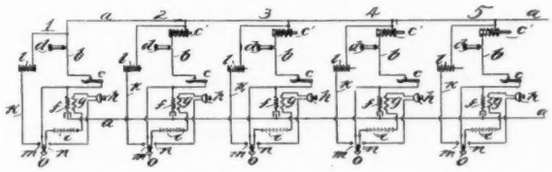


and the ground connection 5, which is associated normally with the lamp s. Repeating coils 4a are used to connect the line with a jack J, and the ground connection 8 is under the control of the relay R'. The cord circuit is likewise provided with clearing-out relays R^2 and R^3, associated on opposite sides of the impedance coil W', which is connected with the battery B'. Further details of the system will be apparent from the illustration.

TELEPHONY.

Hiram D. Currier, Chicago Ill., patent 907,470, July 20, 1908.

A system of telephony is described in this patent, which seeks to overcome the difficulty of properly distributing voice currents throughout a plurality of bridged stations, where the line



resistance is large, as would be the case, for instance, with railway dispatching systems. To this end, the receiver d is in series with an adjustable impedance coil c whose effective opposition to the flow of the current is changed, depending upon its distance from the central station. A second resistance coil l is also provided at each station, which is used when a party at said station is talking, and which is thrown into service by a button o. When a party at any station is listening, the button o is left in the position shown so that the resistance coil l is not in the circuit.

TELEPHONE EXCHANGE SYSTEM.

H. G. Webster, Chicago, Ill., patent 907,659, Dec. 22, 1908.

A common battery telephone system is the subject matter of this application, and it consists of circuits so arranged that the cut-off and line relays may have the resistances of their windings utilized in the control of a supervisory signal in a cord circuit. This is done by arranging the relays and their connections so that when the cord circuit is connected to the line by the answering plugs, the energizing circuits of the line and cut-off relays are connected in bridge of the telephone line limbs, and directly in circuit with the supervisory signal. The closing of this circuit alone causes the display of the supervisory signal; while the usual connection of the line limbs at the sub-station completes a path in shunt to the line and cut-off relay windings thus connected in bridge, thereby varying the current flow through the supervisory signal sufficient to cause its effacement. In this connection, it is necesary, of course, to use as a supervisory relay a construction of the so-called "double-acting" type, previously described in this department in digests of patents issued to the same inventor which were published a short time since.

TELEPHONE SYSTEM.

Harry G. Webster, Chicago, Ill., patent 907,658, Dec. 22, 1908.

The telephone system of this patent is somewhat similar to the preceding one, in that the double acting relay is used for the clearing-out relay in the cord circuit, but an inductive resistance is adapted to be included in bridge of the talking cir-

cuit when the cord circuit is connected. The inductive resistance may be permanently bridged across the talking circuit or only so connected when the cord circuit is in operation. The arrangement is such that the inductive resistance and the supervisory relay are included in the talking circuit when establishing a connection, and when the receiver is removed by the subscriber, an additional path is provided which changes the current in the supervisory relay.

SEMAPHORE.

John Erickson, Chicago, Ill., patent 907,482, Dec. 22, 1908.

This patent covers a semaphore or signal arrangement attached to the upright central shaft of an automatic central station switching mechanism, to indicate to the attendant in the switch-board room whether said switch is in its normal position. The device seems to be covered rather broadly in the claims.

TELEPHONE SYSTEM.

Harry G. Webster, Chicago, Ill., patent 907,682, Dec. 22, 1908.

A four-party line system is the subject-matter of the application, and consists of two biased ringers connected between one lien wire and ground, one operating by positive pulsating current and the other operating by negative pulsating current, and two polarized relays connected between the same line wire and ground, one relay operating with a positive battery current and the other relay with a negative battery current. These two little relays control two alternating current magneto ringers associated therewith at their respective stations.

In the Manufacturing Field

The "American" Individual Subscriber's Station Protector.

Among the protectors approved by the National Board of Fire Underwriters, the "American" individual subscriber's station protectors occupy a prominent place.

The No. 999 individual protector is a combined heat coil, tubular fuse and carbon lightning arrester, mounted on a heavy galvanized porcelain base and furnished with a steel pressed cover.

These protectors are furnished with the "American" improved self-soldering heat coils, which operate in accordance with standard specifications; tubular fuses, which are made either of wood or fiber as preferred, and are lined with asbestos braid enclosing the fuse wire; and large carbon lightning arresters of the saw-tooth style, with carbon ground plates, said by the company to be "self cleaning" and "dust-proof," and having a large discharge surface. The mountings are of heavy whitened brass; and the spring contacts are made with stiff German silver reinforcing springs. The line, instrument, and ground connections are made either with screw nuts, or knurled thumb nuts as desired. The screw holes on the bottom of the porcelain base are filled with an approved insulating compound. The line, instrument, and ground wires enter the protector from the ends, passing through fibre bushings in the steel cover.

These protectors, manufactured by the American Electric Fuse Co., of Muskegon, Mich., and New York City, will be on exhibition at the Electrical Show in the Coliseum, in Chicago, from Jan. 16 to 30 inclusive, together with a complete line of other "American" specialties.

MR. JOHN G. ROBERTS has resigned his position as head of the Patent Department of the Western Electric Company, and has opened offices at 1451 Monadnock Block, Chicago, Ill. He will give to his clients the benefit of an exceptionally valuable training in his work as a consulting engineer and expert in patent causes.

THE L. M. ERICSSON TELEPHONE MANUFACTURING COMPANY, Buffalo, N. Y., reports shipment of three sections type "D" boards for the Plattsmouth Telephone Company, Havelock, Neb.

These boards are equipped with the new Ericsson No. 6 automatically restoring drop. A valuable feature in this drop is the arrangement for adjusting the tension of the armature while the drop is in place. Another useful feature is that the coil may be removed without taking the drop from the panel. the drop and jack are arranged in independent units, so that new lines may be added individually.

The four sections type "B" boards, recently delivered to the Citizen's Telephone Company of Columbus, Tenn., are now installed and in operation. Two of these sections are fitted with 100 each of the new No. 6 automatic drops, the other two being equipped with 400 standard indicator jacks. Automatically self-restoring clearing-out drops and individual rotary four-party keys are provided on these boards.

The Chicago Electrical Show.

Final preparations for Chicago's January Electrical Show are well under way and the sale of space has been so large that there is every reason to believe that the coming show will be the most comprehensive and interesting of all the four shows the Electrical Trades Exposition Company will have given. Every branch of the electrical field will be represented and the exposition will maintain its reputation as Chicago's "Billion Dollar Show."

An unusually comprehensive display of everything new in telephony is assured. Assistant Manager John J. Schayer, who has had charge of this year's show owing to the illness of Homer E. Niesz, feels particularly gratified with the results as they now stand and predicts that the January show will draw the banner figures in the matter of attendance. The complete list of exhibitors to date is as follows: Crane Company, Commonwealth Edison Company, Wagner Electric Company, Federal Electric Company, Cutler-Hammer Company, Pyro One-Light Sign Company, Shelton Electric Company, Lindstrom Smith & Company, Western Insulation Company, National Battery Company, Perfection Vacuum Cleaning Company, Chicago Fuse Wire & Manufacturing Company, Electric Appliance Company, The Excello Arc Lamp Company, Kellogg Switchboard & Supply Company, The Stoltz Electrophone Company, Stromberg-Carlson Telephone Manufacturing Company, Mathias Klein & Sons, Telephony Publishing Company, Manhattan Electrical Supply Company, Ft. Wayne Electric Works, Electrical World, Benjamin Electric Company, Electrical Record, Central Electric Company, International Correspondence Schools, McRoy Clay Works, Chicago Pneumatic Tool Company, Robbins & Myers, Appleton Electric Company, United Pump & Power Company, Commercial Appliance Company, Electric City Publishing Company, Taussig & Babcock, Western Electrician, Westinghouse Electric & Manufacturing Company, Autolectric Sign Company, General Electric Company, American Steel & Wire Company, National Acme Manufacturing Company, Hahl Automatic Clock Company, Swedish-American Telephone Company, Swedish Electric Vibrator Company, Popular Electricity, Jewell Electrical Instrument Company, Roth Bros. Company, Crescent Company, H. W. Johns-Manville Company, Red Cross

Antiseptic Company, Northern Electrical Manufacturing Company, A. W. Kratz, Illinois Electric Renovator Sales Company, Hurley Machine Company, Murphy Electricity Rectifier Company, National Electric Lamp Association, Electrocraft Publishing Company, Electrical Testing Laboratories, American Electric Fuse Company, The Caloric Company, The Allis-Chalmers, North Shore Electric Company, Simplex Company, Cyclone Storage Battery Company, Electric Storage Battery Company, Connersville Blower Company, Electric Cleaner Company, Pelonze Electric Heater Company, C. S. Neville & Company, Mears Ear Phone Company, National Carbon Company.

The show will run from Saturday, January 16 to Saturday, January 30, thirteen days against twelve heretofore. There will be several convention and souvenir days. Extensive preparations have been made to exhibit the latest apparatus for telephone systems as well as complete lines of standard equipment.

The Stromberg-Carlson Branch House at Kansas City.

Customers of the Stromberg-Carlson Telephone Manufacturing Company in the Southwest seem to be very much pleased with the facilities now at their disposal, through the opening of the new warehouse and offices at Kansas City. Here is kept a complete stock of standard telephone

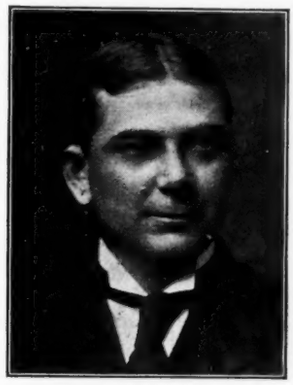
Stromberg-Carlson Branch at Kansas City, from which the Company's Business in the Southwest is Handled.

apparatus and construction material of the company's manufacture.

This not only makes it convenient for inspection to telephone men who have occasion to visit Kansas City, but reduces the time of delivery on all orders sent in by mail or given to salesmen. The benefits are felt by customers all through the states of Missouri, Kansas, Arkansas, Oklahoma, Louisiana, Texas and New Mexico, and in not a few other localities.

A considerable amount of the success of this branch house in meeting the needs of the Middle West and Southwest is no doubt due to the personality of the manager, Mr. Ben C. Hyde. Mr. Hyde is not only a genial and able business man, but is thoroughly familiar with the operating side of the telephone business, having been not only a manager, but an owner of Independent telephone exchanges before he was connected with the Stromberg-Carlson company.

Since January, 1906, he has visited many exchanges to explain the merits of Stromberg-Carlson apparatus, and the company's having furnished him such up-to-date and expensive headquarters and an able staff of assistants, is not



Mr. Ben C. Hyde.

only a tribute to his ability, but is a testimonial to the value of the patronage of the Independent companies in this section.

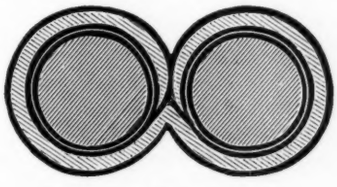
THE MINNESOTA ELECTRIC COMPANY, Minneapolis, Minn., is sending out a booklet describing lightning arresters for telephone and telegraph lines.

A New Harvard Self-Welding Wire Joint.

The Harvard Electric Company, Chicago, Ill., is calling attention to a new self-welding wire joint for which claims of high efficiency are made. This joint has beveled edges, which creep around the inside of the barrel when the joint is twisted, thus reducing the hole uniformly along the entire length of the joint, in this manner insuring that there are no air gaps to collect moisture or sweat. The manufacturer claims that this perfect result can only be obtained with a beveled edge joint, and one of the convincing arguments in proof of that claim can be demonstrated by any one with a copy of a magazine, such as TELEPHONY. Taking the magazine lengthwise in the hands, form a roll with the edges inside; note how the leaves separate and lie smooth, making a natural beveled edge, reducing the hole gradually but uniformly and preserving an even, round hole.

Imagine a wire inside, and you can easily understand the principle of the Harvard joint.

Now roll the magazine again, this time with the bound back inside (representing the square edge of old-style



Section of Harvard Joint.

joints), and you will find that the internal hole is no longer exactly round. You can then readily imagine how air spaces can exist in all square edge joints.

Subscribers to TELEPHONY may obtain samples of the new joint, for making tests, by writing to the Harvard Electric Co., 70 W. Van Buren street, Chicago, Ill.

THE ST. LOUIS MALLEABLE CASTING COMPANY, of 7700 North Conduit avenue, St. Louis, Mo., has issued a 40-page catalogue of its high-grade malleable and gray iron castings, and its electrical specialties for railway, lighting, telephone, telegraph and mining companies. This catalogue, No. 150, deals with

pins, brackets, pole steps, cross-arm supports, guy wire clamps, strain catenary hangers, bolts, sleeves, anchors, washers, etc., all of which are illustrated, and prices are quoted.

THE MINNEAPOLIS ELECTRIC & CONSTRUCTION COMPANY, Minneapolis, Minn., has issued an illustrated folder devoted to a wire reel and meter for reeling and measuring wire.

THE E. W. BLISS COMPANY, Brooklyn, N. Y., has recently issued a new catalogue of "Bliss" machinery for manufacturing electrical parts. Illustrations and descriptions are given of machinery for various operations performed in factories where electrical equipment is manufactured.

The Stromberg-Carlson Company's New Series of Bulletins.

The Stromberg-Carlson Telephone Manufacturing Company has decided to issue a new series of bulletins which will be of the same general appearance as the bulletins issued by other electrical manufacturers.

The first bulletin of this new series is bulletin No. 1000, describing the company's "mine-a-phone" system. he various types of instruments used in this system are illustrated and described, and the wiring diagram of a typical metallic circuit is given.

THE MASSACHUSETTS CHEMICAL COMPANY has recently established new quarters for its Boston office, at 185 Summer street, opposite the South Station and across the street from its old location at 170 Summer street. The new quarters are better arranged and more commodious than the former ones, and are equipped with better facilities for handling the growing business of the company. Mr. E. W. Furbush, general manager of the company, usually spends the mornings at the factory at Walpole, and the afternoons at the Boston office. Mr. Louis O. Duclos, the general sales manager, will make his headquarters at the new offices.

THE HABIRSHAW WIRE COMPANY, 253 Broadway, New York, has recently issued price lists on its wires, and which present this information in a convenient form.

Condensed News Reports

Officers of companies are earnestly requested to forward us promptly all financial and other statements as soon as issued and any items of interest as to their plants and systems

PERSONAL.

MR. A. W. EHLBE, of Pekin, Ill., is the new manager of the People's Telephone Company at Lacon, Ill.

MR. W. H. LIGGETT has been elected president of the Farmers' Mutual Telephone Company, of Herrington, Kan., succeeding Mr. E. E. Rathborn, resigned.

MR. E. H. REEVES, of Columbus, Miss., has been promoted to the managership of the Cumberland Telephone & Telegraph Company's exchange at Jackson, Miss.

MR. J. BOYD, formerly of Smithville, Texas, has been appointed manager of the Southwestern Telegraph and Telephone Company's exchange at Flatonia, Texas.

MR. CHAS. ROYSE, formerly manager of the Home Telephone Company, at Guthrie, Ky., has been appointed manager of the Home Telephone Company at Mayfield, Ky.

MR. A. N. HUGGINS, formerly manager of the exchange of the Southern Bell Telephone and Telegraph Company at Cullman, Ala., has been promoted to the managership of the company's exchange at Decatur, Ala.

MR. L. A. DOLAN, formerly with the Providence Telephone Company, and afterward with the engineering department of the American Telephone & Telegraph Company, has been elected president of the Telephone Society of Nova Scotia.

SUPERINTENDENT McCAULEY, of Port Arthur, Ont., Can., who formerly had charge of the municipal street railway system before its operation was taken over by a joint commission, has been given charge of the municipal telephone system in Port Arthur.

MR. DAVID A. BURNELL, recently manager of the Spring Valley and Ladd exchanges of the Bureau County Telephone Company at Pekin, Ill., has been employed by the Union Independent Telephone Company to take charge of the Morton exchange.

MR. HENRY A. BARNHART, of Rochester, Ind., recently elected to Congress from the Thirteenth district, has been a prominent advocate of the Independent telephone movement in Indiana. Mr. Barnhart is president of the Rochester Telephone Company and the excellent service in a large part of northern Indiana is due to the wo k of Mr. Barnhart and associates.

NEW COMPANIES.

CHENOA, ILL.—The charter for the Chenoa Telephone Company has been received and the directors have elected the following officers: President, John N. Gentes; treasurer, John F. Johnson; secretary, W. R. Shinn. The company is capitalized for $5,000 and the shares will be sold at $25. The directors are: John N. Gentes, J. F. Johnson, W. R. Shinn, John H. Parsons and B. F. Elfrink.

DES MOINES, IA.—The Woden Farmers' Telephone Company of Woden, is the name of a new telephone company recently incorporated with a capital stock of $2,000.

COOLIDGE, KAN.—J. H. Conrad was chosen president, and O. O. Glenn, secretary-treasurer of the Coolidge Telephone Company, which was recently organized at this place.

LAKE CHARLES, LA.—The Merryville Telephone Company, which will construct a line from Merryville, has been chartered, with $10,000 capital. Dr. J. H. Knight is president; B. H. Carroll, vice-president, and R. E. Welbern, secretary-treasurer.

LONG LAKE, MINN.—The Long Lake Rural Telephone Company has organized by electing the following officers: George Sinclair, president; Gust Carlson, vice-president; John Sandgren, secretary; Andrew Olson, treasurer.

BIBLE GROVE, MO.—A commercial telephone company has been organized with Robert Burrus as president; J. T. Salisbury, secretary, and A. N. Barb, treasurer.

BEACH, N. D.—The Golden Valley Telephone Company is the name of a new company which has recently been incorporated, with a capital stock of $10,000. The incorporators are: J. P. Smith, of Sentinel Butte, N. D.; G. D. Lovell, Edward Hoverson and others, of Beach, N. D.

GUTHRIE, OKLA.—Thos Conklin, Jos. Hewitt, Chas. Heaton, John F. Romine, W. L. Shipley, I. J. Claypool and S. A. Marshall are the incorporators of the Oakwood Mutual Telephone System of Oakwood, Dewey county, with $600 capital stock.

PORTLAND, ORE.—T. L. Evans, W. C. Hicks and Fred C Reed have filed articles of incorporation of the Columbia Telephone Company of Oregon. The capital stock is $1.200.

PHILADELPHIA, PA.—The Blacktown Telephone Company of Blacktown, Mercer county, was recently incorporated with a capital stock of $10,000.

PRICETOWN, PA.—A telephone company has been organized here which will be known as the Pricetown Rural Telephone Company. The following officers were elected: President, S. J. Hill; secretary, D. H. Manwiller; treasurer, G. Web. Brown; directors, Wm. Stoudt, W. Henry Noll, S. J. Hill, D. H. Manwiller and G. Web. Brown.

SALTSBURG, PA.—The business men of Marion Center have organized the Marion Center Telephone Company with the following officers: President, H. P. Wetzell; vice-president, Dr. L. N. Park; secretary, Dr. A. H. Stewart; treasurer, William C. Griffith.

HAYTI, S. D.—A new farmers' telephone company has been organized at this place under the name of the Hamlin County Farmers' Telephone Company. It has been incorporated with a capital stock of $25,000.

VOLIN, S. D.—The Volin Telephone Exchange Company was recently incorporated with a capital stock of $25,000.

AUSTIN, TEX.—A charter has just been issued to the Bello Telephone Company, of Bello, DeWitt county, which has a capital stock of $1,000. The incorporators are: Charles Wild, George C. Rehmet, George C. Milner, Westhoff, DeWitt county.

POUND, VA.—The Pound Telephone Company has been organized here by Meredith Mullins, Robert Mullins and Gideon Webster, with capital of $5,000, fully paid in. Meredith Mullins will be manager. Construction work will be begun at once.

PINEY, WYO.—The Piney Mutual Telephone Company has been organized for the purpose of connecting this place with Sheridan by telephone.

DUNDURN, SASK., CAN.—The Dundurn Rural Telephone Company has been incorporated here by J. Burkitt and others.

BUXTON, N. D.—At the annual meeting of the Red River Telephone Company, the affairs of the company were shown to be in excellent condition. A dividend of 12 per cent was declared and a surplus of $4,000 set aside.

DALLAS, TEX.—The North Texas Telephone Company of Sherman, has filed an amendment to its charter increasing its capital stock from $52,000 to $60,000.

NORTH YAKIMA, WASH.—Articles of incorporation of the Wenas Telephone Company, capitalized at $5,000, have been filed with the county auditor. The first trustees are Robert Cameron, George Longmire, A. J. Lotz, Harry E. Irving, Henry Lotz, S. D Saunders and John Cleman.

SUNNY HILL, SASK., CAN.—The Sunny Hill Rural Telephone Company has been incorporated to build a rural telephone system. E. J. Wright, Regina, Sask., is one of those interested in the company.

FRANCHISES.

NEWTON, KAN.—The city council granted a franchise to the Home Telephone and Telegraph Company, permitting the company the privilege of establishing a long distance toll station in this city.

PITTSTON, PA.—The directors of the Commonwealth Telephone Company, at their annual meeting declared an 8 per cent dividend and added $5,300 to the surplus fund.

SPOKANE, WASH.—An application has been made by Nixon & Kimmel to the county commissioners for a franchise to build an electric power and telephone line on the Darknell and Tyron Gulch roads between Waverly and Fairfield for a distance of about four and a half miles. This line will connect systems now in operation in the two towns.

CONSTRUCTION.

HOLLYWOOD, ARK.—W. H. Tweedle has established a telephone system at Hollywood, Clark county, which he proposes to extend to the farm houses for several miles in all directions from Hollywood.

WARDNER, IDAHO.—The North Idaho Telephone Company is constructing a line from Anaville to Murray, and is stringing a complete copper circuit especially for toll use, and two iron circuits for local use. The company expects to have Burke and the Canyon towns connected with the Wallace exchange about the first of the year. The business the new line is doing in Wallace has proven gratifying to the management, there now being over 300 telephones installed in the city, while the company has placed about 40 in the town of Mullan. Two additional circuits were recently completed between Wallace and Wardner to handle the increased business over the toll lines. This gives the North Idaho company five complete toll-line circuits between the Twin Cities and Wallace.

CANTON, ILL.—A telephone system is being installed at Aledo by the People's Telephone Company. Many country lines are also being constructed. Already four miles of cable have been strung.

LARWILL, IND.—A new switchboard has been installed in the local exchange of the Farmers' Mutual Telephone Company, of which John Dietrich is manager.

BRANDON, IOWA.—A commercial telephone line will be built by the Farmers' Mutual Telephone Association from Brandon toward La Porte, connecting with the La Porte system.

COLUMBUS, KAN.—The Cherokee County Mutual Telephone Company will install a modern switchboard with 500 drops in connection with a common battery.

FLORENCE, KAN.—Mr. Immasche will build about three new telephone lines and put in 100 new telephones in the near future.

DEMOCRAT, KY.—The Upper Rockhouse & Beaver Creek Telephone Company announces that it will build a new line from Deane, Ky., via Boone's Fork to Baker, where an important connection will be made with the Eastern Kentucky Home Telephone Company, connecting with Pikeville, Ky., and the Letcher County Home Telephone Company, connecting with Sergent and Whitesburg. Construction material will be needed for this work. Dr T. A. Cook, of Democrat, is manager of the Upper Rockhouse & Beaver Creek Telephone Company.

PINE TOP, KY.—The Carrs Fork Telephone Company has installed a switch at Cody, Ky., and the lines are being repaired and overhauled. Jerry Smith, of Cody, Ky., has been chosen manager of the company.

WHITESBURG, KY.—The Whitesburg Telephone Company is making preparations to improve its system by building new lines in the city. A new and larger switchboard will be installed to meet the increasing demands for service. A double line will be built to Big Stone Gap, Va., via Eolia, a distance of 35 miles. Construction material will be needed for this line. S. H. Fields is manager of this company.

AKRON, MINN.—The telephone company which was recently organized by the farmers residing in this vicinity, will soon begin the construction of its line.

BADGER, MINN.—The Farmers' Telephone Company is considering the feasibility of establishing a central of its own in this village.

ENGLUND, MINN.—A telephone line is being constructed between this place and Florian.

ERHARD, MINN.—Work will soon be started on the extension of the Erhard telephone line.

FELTON, MINN.—The Felton rural telephone line is being extended into the town of Mary, and will later be connected with the Lee telephone line.

LONG PRAIRIE, MINN.—It was decided at a recent meeting to construct a telephone line in this village.

MAINE, MINN.—The new telephone line which is being constructed from this place to Phelps will soon be ready for operation.

ST. JOSEPH, MINN.—There is talk in this place regarding the installation of rural telephone lines.

VERGAS, MINN.—The Frazee Telephone Company will install a telephone system in this town the coming winter.

LUXEMBURG (R. F. D. from St. Cloud), MINN.—Many improvements to its lines will be made by the Luxemburg Telephone Company.

MAINE, MINN.—A new farmers telephone line will be constructed in this city from Underwood, connecting with the line which was recently constructed through Maine.

STATE LINE (P. O. Emmond), MINN.—At a recent meeting of the Ash Creek Telephone Company it was decided to purchase new telephones for their entire line.

FREMONT, NEB.—A new toll board has been installed in the local office of the Independent Telephone Company.

HASTINGS, NEB.—The Hastings Independent Telephone Company will construct a new line direct from Hastings to Prosser, where a connection will be made with the Prosser Telephone Company. A new line has recently been completed between Hastings and Trumbull.

STRANG, NEB.—The new Strang and Geneva toll line has been completed. This new line adds much to the value of the lines recently built in and around Strang.

DUNKIRK, N. Y.—The police commissioners have voted to establish a telephone and alarm system in patrol booths to be placed in all the wards.

FARMINGTON, N. Y.—The Farmers' Mutual Telephone Company is building a new line from Nelson to Tioga, which, when completed, will be a great convenience to the people along the line.

PARIS HILL, N. Y.—The People's Telephone Company has completed a line between this place and Sauquoit.

FRANKLIN, N. C.—The Franklin Telephone & Electric Company has overhauled the line between Franklin and Cullasaja and installed a number of new telephones.

BALFOUR, N. D.—A telephone line is being constructed by the Balfour Telephone Company to Kief.

BELFIELD, N. D.—Work has been started on the construction of the new telephone line running to the north.

CARRINGTON, N. D.—A telephone line is being constructed from this place to Pleasant Valley.

HURD, N. D.—The farmers in this vicinity are constructing a telephone line.

MOTT, N. D.—The Cannon Ball Telephone Company expect to complete the construction of its lines to Haynes by Jan. 1.

GRAND RAPIDS, OHIO.—The Grand Rapids Mutual Telephone Company has made a number of improvements in its telephone system. Among them is the installation of a new 150-drop switchboard.

CARNEGIE, OKLA.—Dr. G. O. Hall will install a 100-drop switchboard to accommodate increasing business.

BIG STONE, S. D.—A new switchboard has been installed in the local exchange of the Grant County Telephone Company. In the spring the company will build lines to Linden Beach and Vernon.

LEMMON, S. D.—The Montana and Dakota Telephone Company has completed its line from Lemmon to the Montana line, and is now building a branch line from Haynes, N. D., to Mott, N. D., an inland county seat town. The company expects to build east from Lemmon across the Standing Rock reservation next spring to connect with the Dakota Central at Mobridge. A local company is putting in an up-to-date cable system at Lemmon.

CLARENDON, TEX.—The Clarendon Telephone Company is building a line to Lelia Lake, which will connect with a large was appointed to investigate the matter.

ANTIGO, WIS.—The Antigo Telephone Company will immediately install a new 600-line multiple switchboard at a cost of $3,000. Early in spring much aerial work will be replaced by conduits, several thousand feet of cable will be strung, and several miles of lines added to the present county extensions.

CARTER, WIS.—The Carter & Wabeno Telephone Company is extending its line from Carter to Suring. From Suring the line will be extended to several small towns nearby.

ROCKLAND, WIS.—The Rockland Telephone Company is extending its line north toward Maple Grove, and will soon have a large number of new patrons.

STOCKHOLM, WIS.—The feasibility of constructing a telephone line between Lund and Stockholm is being considered.

SURING, WIS.—A telephone line will be constructed from Laona to this place.

NEWCASTLE, WYO.—The Ranch and Home Telephone Company has examined the country between Sundance and Newcastle and is planning to connect the two towns with a standard, 4-wire line. The new line will also give Newcastle connection with Upton and Nahant.

PRINCE RUPERT, B. C., CAN.—A telephone exchange will be installed and operated at this place by the Grand Trunk Pacific Railway.

WINNIPEG, MAN., CAN.—It is now announced that the new telephone exchange being built here by the Manitoba Telephone Commission will not be ready for occupancy until February 1.

ELECTIONS.

PHOENIX, ARIZ.—The new board of directors of the People's Independent Telephone Company are: M. A. Stanford, Dr. Foss, John Richard Osmundson and L. D. Rousseau.

CORONA, CAL.—At the annual meeting of the Corona Home Telephone and Telegraph Company's stockholders, the election of directors resulted as follows: W. H. Jameson, D. M. Browning, V. A. Gleason, Dr. S. S. Willard, A. C. Wood, C. D. McNeil and J. Sunderland.

BLOOMINGTON, ILL.—The stockholders of the McLean County Home Telephone Company have elected the following officers for the ensuing year: President, F. Y. Hamilton; vice-president, George Bohrer; secretary, Henry Thobro; treasurer, W. H. Johnson; manager, E. C. Ryan.

CAMERON, ILL.—At the annual meeting of the Warren County Telephone Company, the following officers were elected: President, George Bruington; secretary-treasurer, Wm. Mills. Directors: O. H. Kelly, D. R. Bradley, W. C. Whitman, A. D. Bruington and S. W. Shelton.

COLCHESTER, ILL.—The Farmers' Telephone Company has elected the following officers: J. Stookey, president; J. M. Clayton, vice-president; Henry Cuba, secretary: Frank Hunt, treasurer.

LUDLOW, ILL.—North Harwood Telephone Company, at its annual meeting elected the following directors: George Watson, C. E. Arnold, James Kirk, M. Shinker and D. H. Claudon.

SIGEL, ILL.—The new officers of the Mutual Telephone Company are C. V. Chappelear, president; G. M. Lugar, vice-president; R. M. Baker, treasurer; Geo. Ludwig, secretary.

FORT WAYNE, IND.—The old officers and directors of the Home Telephone Company were re-elected at the recent annual meeting, and one additional member added to the board of directors. The officers are: President, Charles S. Bash; vice-president, J. B. Reuss; secretary, William L. Moellering; treasurer, Max B. Fisher. The board of directors as now constituted consists of the executive officers and the Messrs. Isidor Lehman, W. A. Bohn, G. Max Hoffmann, P. W. Smith and August E. C. Becker.

MARENGO, IA.—The election of officers at the annual meeting of the Iowa County Mutual Telephone Company resulted in the following being elected: President, R. I. Smith; vice-president, A. A. McGivern; secretary, Dennis Sullivan; treasurer, A. A. Brimmer; directors, Geo. W. Danskin, J. D. Williams and Chris. Conrad.

WINTHROP, IA.—All the old directors of the Winthrop Mutual Telephone Exchange were re-elected at the annual meeting. The officers of the company are: Dr. Shine, president; E. E. Brintnall, secretary-treasurer; manager, J. D. Jackson. Directors, Harry Knowles, Fred Ebersole, Grant Singer, Henry Laird.

CAVE, KAN.—At the annual meeting of the South Gray Telephone Company the following officers were re-elected: John Brock, president; R. V. Derry, secretary; G. H. Culver, treasurer.

DIGHTON, KAN.—The officers of the Lane County Telephone Company for the coming year are: President, Amos G. Smith; secretary, W. E. Kell; treasurer, Clarence Murray.

PRAIRIE VIEW, KAN.—The following are the new officers of the Prairie View Telephone Company: President, R. H. Holmes; vice-president, Israel Burger; secretary, A. C. Mendenhall; treasurer, J. C. Beasley. Directors, J. C. Orten, George Thomas, J. A. Reed.

ALGONA, LA.—At the recent annual meeting of the Algona Telephone Company, C. F. Lathrop was elected treasurer to take the place of H. E. Rist, and . L. Peterson was made a director in place of W. C. Dewel, who has retired from the company. These were the only changes made in the officers.

BANFIELD, MICH.—The following officers have been elected by the stockholders of the Banfield Telephone Company: President, Dr. O. R. Cooper; vice-president, C. H. Palmatier; secretary, D. C. Stiles; treasurer, A. M. Edmunds; general manager, J. E. Chandler; auditor, H. Budd.

ELLENDALE, MINN.—At the annual meeting of the stockholders of the Ellendale Rural Telephone Company the officers for the ensuing year were elected as follows: E. M. Thompson, president; E. E. Ellingson, vice-president; W. E. Galloway, secretary-treasurer.

YOUNG AMERICA, MINN.—At a special meeting of the directors of the Norwood-American Telephone Company, H. F. Lueders was elected to succeed F. W. Boeltz, as secretary of the company. G. W. Ocobock was elected president, succeeding Mr. Lueders.

MAYSVILLE, MO.—Judge A. L. Bohanan, of Colfax, C. P. Faul, of Washington, and J. E. Roberts, of Adams, were elected directors of the DeKalb County Telephone Company at the recent annual meeting.

AFTON, N. Y.—The Afton and Middlebridge Telephone Company has elected the following officers: President, R. R. Lord; vice-president, William Jamison; secretary, A. D. Pearsall; treasurer, E. W. Lingee; director, Frank Scott.

ALBANY, N. Y.—The Independent Union Telephone Company, which is organized to conduct the business of the long distance service of the local Home Telephone Company, has elected the following directors: Irving H. Griswold, Theodore M. Brush, George H. Rymers, Howard Hendrickson, F. W. Sudro, A. E. Lord, F. W. Martin, P. J. Fitzgerald and F. E. Griffin.

BOWDON, N. D.—At the annual meeting of the Bowdon Telephone Company the following directors were elected for the coming year: Geo. Schlechter, W. J. Schmitt, Christ T. Anderson. The officers of the company are: Geo. Schlechter, president; A. W. Eynon, treasurer; A. D. Priest, secretary and manager.

HAMILTON, OHIO.—The Middletown Telephone Company has re-organized by electing Walter S. Harlan, of Hamilton, president; L. T. Palmer, of Middletown, secretary. Directors were chosen as follows: D. B. Bundy, of Middletown; G. McCommas, of Cincinnati; H. E. Allen, of Dayton; R. C. Van Derveer and John W. Martin, of Middletown. John Newberry was re-elected manager.

BELLINGHAM, WASH.—At the annual meeting of the Farmers' Mutual Telephone Company the following officers and directors were elected: President, Ed. Brown, of Custer; vice-president, Davis White, Everson; secretary, D. L. Dakin, Custer; treasurer, H. J. Welty, Bellingham. Directors: J. Snyder, H. Lockhart, Davis White, Ed. E. Marshall, L. G. Van Velkenburg, L. W. Norton, Ed. Brown.

HEBRON, W. VA.—At the annual meeting of the stockholders of the Finch Telephone Company, the following officers were elected for the ensuing year: President, W. J. Wince, vice-president, N. H. Williamson; secretary, W. D. Williamson; treasurer, J. M. Wilcox. Board of directors: W. J. Wince, A. N. Riggs, H. F. Simonton, Perry Riggs, G. W. Ryan, J. M. Wilcox, N. H. Williamson. General manager, W. D. Williamson.

MISCELLANEOUS.

OWENTON, KY.—Judge J. M. Lassing has purchased the Owenton Telephone Company, and proposes to put the system in first-class condition.

ALBANY, N. Y.—Arrangements have been completed for taking over the shares of the local Hudson River Telephone Company (Bell) by the Bell Telephone Company of Pennsylvania on the basis of three shares of Hudson River for two shares of Bell-Pennsylvania. The transfer will take place Jan. 31.

BUTTE, MONTANA.—District court records show the following, under date of Dec. 12, 1908:

Utah Fire Proofing Co. vs. Rocky Mountain Bell Telephone Co.; notice of lien on lots 4 and 5, block 31, Butte, Montana, for labor and material amounting to $5,792.65, also a lien for $700 for labor and material.

Although the company began the construction of a new central office building in Butte nearly two years ago, it is still unfinished.

CONNEAUT, OHIO.—In an advertisement, the Conneaut Telephone Company announces that after the first of the year an added charge of 25 cents will be made in the rental of all telephones when the same is not paid promptly by the end of the month. In discussing the subject, Manager Goebricher of the telephone company has the following to say: "We are forced to make this extra charge on account of the added cost of collecting. This does not raise the rent of the telephones, and no one need to worry when they pay promptly."

ORWELL, OHIO.—The fourth annual meeting of the Northeastern Ohio Telephone Association will be held at Orwell, Ashtabula county, Ohio, during the first week in February, 1909. The president of the association is Charles E. Noble, Orwell, Ohio. The exact date of the meeting will be given out the latter part of January.

EDMONTON, ALB., CAN.—Despite the fact that the municipal telephone system has only been completed a few weeks, the supply of instruments has run out, the demand for connections being far greater than was anticipated.

NELSON, B. C., CAN.—At the coming meeting of the associated boards of trade of the northern district, a motion will be introduced to provide for the government ownership of all telephone lines and systems in British Columbia.

PORT ARTHUR, ONT., CAN.—At the coming municipal elections the rate payers will vote to decide whether the electrical interests of this city, including the telephone, electric light and street railway systems, shall be operated by a commission appointed by the city as is now the case or whether a board of experts removed from ward influences shall be engaged.

FORT WILLIAM, ONT., CAN.—At the coming municipal elections the ratepayers will vote on a by-law to raise $18,000 for improvements to the municipal telephone system.

UNDERGROUND.

SIMCOE, ONT., CAN.—The Bell telephone company has decided to put its telephone wires here underground.